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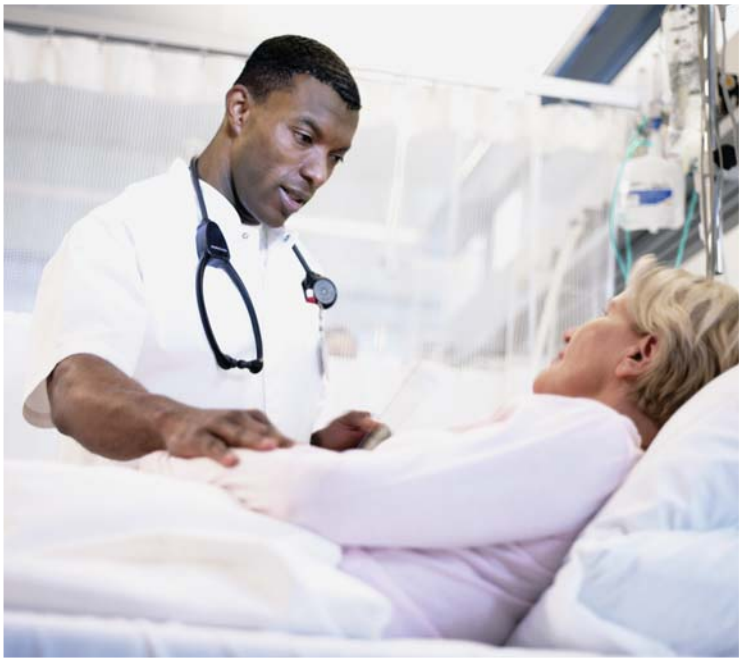

PageWriter Trim I, II, III, Rx

SERVICE MANUAL

Notice

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The Philips Medical Systems PageWriter Trim cardiograph complies with all relevant international and national standards and laws. Information on compliance will be supplied on request by a local Philips Medical Systems representative, or by the manufacturer.

Intended Use of this Service Manual

This Philips product is intended to be operated only in accordance with the safety procedures and operating instructions provided in this *Service Manual*, and in accordance with the purposes for which it was designed. Installation, use, and operation of this product is subject to the laws in effect in the jurisdiction(s) in which the product is being used. Users must only install, use, and operate this product in such a manner that does not conflict with applicable laws or regulations that have the force of law. Use of this product for purposes other than the express intended purpose provided by the manufacturer, or incorrect use and operation, may relieve the manufacturer (or agent) from all or some responsibility for resultant non-compliance, damage, or injury.

United States federal law restricts this device to use by or on the order of a physician. THIS PRODUCT IS NOT INTENDED FOR HOME USE.

Training

Users of this product must receive adequate clinical training on its safe and effective use before attempting to operate the product as described in this *Service Manual*.

Training requirements vary by country. Users must ensure that they receive adequate clinical training in accordance with local laws or regulations.

For further information on available training on the use of this product, please contact a Philips Medical Systems representative, or the manufacturer.

Medical Device Directive

The PageWriter Trim Cardiograph complies with the requirements of the Medical Device Directive 93/42/EEC and carries the CE 0123 mark accordingly.

Authorized EU-representative:

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1

Introduction

This *PageWriter Trim I, II, III, Rx Cardiograph Service Manual* provides the information you need to successfully service the PageWriter Trim cardiographs with software version A.01.03 and higher. The PageWriter Trim Cardiograph product family includes the following four product models as described in Table 1-1.

Table 1-1 PageWriter Trim Product Model Information

PageWriter Trim model	Philips Part Number
PageWriter Trim III	860286
PageWriter Trim II	860288
PageWriter Trim I	860290
PageWriter Trim Rx	860297

This *Service Manual* includes information on:

- Theory of operation
- Maintenance procedures
- Performance verification and safety testing
- Repairs
- Ordering parts and supplies
- Specifications
- Maintenance tests
- Software Installation
- Wireless LAN Installation
- Upgrade Kit Installation

Before servicing the PageWriter Trim cardiographs, review the *PageWriter Trim Instructions for Use* located on the User Documentation CD shipped with the cardiograph, or download the file from the Philips InCenter site (incenter.medical.philips.com). For information on accessing the InCenter site, see “Using the Philips InCenter Site” on page 1-26. This service manual assumes you are familiar with the controls, basic cardiograph operations, and capabilities of the device as described in these documents.

Who Should Use this Manual

This manual is intended for users who handle preventive maintenance, periodic operational checks, and basic troubleshooting for PageWriter Trim cardiographs.

Before attempting to service the cardiographs, you must review the following documentation and training materials:

- *PageWriter Trim Instructions for Use*
- *PageWriter Trim Cardiograph Interactive Training Program*
- This *Service Manual*

This *PageWriter Trim Cardiograph Service Manual* is intended to assist users in the safe and effective use of the product.

Before attempting to operate this product, read this *Service Manual*, and note and strictly observe all Warning and Cautions as described in this document.

Pay special attention to all of the safety information provided in the Safety Summary section. For more information, see page 1-5.

The following conventions are used in this document.

WARNING **Warning statements describe conditions or actions that may result in a potentially serious outcome, adverse event, or a safety hazard. Failure to follow a Warning may result in death or serious injury to the user or to the patient.**

CAUTION Caution statements describe when special care is necessary for the safe and effective use of the product. Failure to follow a caution may result in minor to moderate personal injury or damage to the product or other property, a remote risk of more serious injury, or may cause environmental pollution.

NOTE Notes contain additional important information about a topic.

TIP A Tip contains suggested information on using a particular feature.

Menu items and button names appear in bold no-serif font. Example: Touch the **Config** button.

Internal software components or file directories appear in regular no-serif font. Example: ECGs are stored to the RubyArchiveInternal directory.

Safety Summary

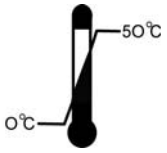
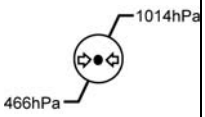
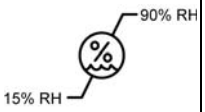
Safety Symbols Marked on the Cardiograph

Symbol	Name	Description
	Attention	See *PageWriter Trim Instructions for Use* for information.
	Type CF	ECG physio isolation is type CF, defibrillator proof. Electrical leakage current is suitable for all patient applications including direct cardiac application.
	Alternating current	Indicates that the cardiograph is receiving alternating currents.
	On/Standby	Pressing the button with this symbol on it turns on the cardiograph or puts the cardiograph into Standby (power saving mode).
	Electrostatic Discharge	Do not touch exposed pins. Touching exposed pins can cause electrostatic discharge that can damage the cardiograph.
	Equipotential grounding post	Equipotential grounding post used for establishing common ground between instruments.
	Fuse	Cardiograph contains a 1.5 amp (250V) time-delay fuse.
	Input	The connector near this symbol receives an incoming signal.
	Serial Number	The number next to this symbol is the serial number of the cardiograph.
	Product model number	The number next to this symbol is the product model number of the cardiograph
	Entry of liquids	The cardiograph is not protected against splashing water.
	Entry of liquids	The PIM (Patient Interface Module) is protected against splashing water. Water splashed against the PIM from any direction shall have no harmful effect.
	AC power indicator light	When lit, indicates that AC power is on. The battery is charging when inserted into the cardiograph.

Safety Symbols Marked on the Cardiograph *(continued)*

Symbol	Name	Description
GMDN	Global Medical Device Nomenclature Code	Global Medical Device Nomenclature Code is a 5-digit code providing a brief description of the device, as defined by EN ISO 15225.

Safety Symbols Marked on the Cardiograph Packaging

Symbol	Description
	Keep dry.
	Ambient temperature range of 0 °C (32°F) to 50 °C (122° F) (non-condensing) for transport and storage.
	Atmospheric pressure range of 466 hPa to 1014 hPa for transport and storage.
	Relative humidity range of 15% to 90% (non-condensing) for transport and storage.
	Move and store packaging this end up.
	Fragile.
	Sealed lead acid battery. Do not dispose of in trash. Follow local regulations for disposing of as small chemical waste.

Safety Symbols Marked on the Cardiograph Packaging *(continued)*

Symbol	Description
	Dispose of in accordance with the requirements of your country.
	This product consists of devices that may contain mercury, which must be recycled or disposed of in accordance with local, state, or federal laws. (Within this system, the backlight lamps in the monitor display contain mercury.)

Safety and Regulatory Symbols Marked on the Cart

Symbol	Name	Description
	Cart Transport	Use care when moving the cardiograph cart. Pushing the cart over bumps without holding onto the cardiograph may cause the cart to tip.
	Cart Storage Bin Weight Limit	Do not place more than 3 kilograms or 6.6 pounds of weight into the cart storage bin.

Important Patient and Safety Information

The PageWriter Trim cardiograph isolates all connections to the patient from electrical ground and all other conductive circuits in the cardiograph. This reduces the possibility of hazardous currents passing from the cardiograph through the patient's heart to ground, and from other equipment connected to the patient passing through the leads into the cardiograph to ground.

WARNING **Failure to follow these warnings could affect both patient and operator safety.**

WARNING **The Welsh bulb electrodes (available as an accessory for the cardiograph) do not meet the requirements of IEC 60601-2-25 for defibrillation recovery time, and cannot be reliably used for immediate patient diagnosis following defibrillation.**

WARNING **The PageWriter Trim I cardiograph is not recommended for diagnostic cardiograph use during defibrillation. It does not provide real-time data in less than 10 seconds. Reusable electrodes should not be used during defibrillation for diagnostic purposes as ECG recovery will be greater than ten seconds.**

WARNING **Do not touch accessible connector pins and the patient simultaneously.**

Electrical shock hazard. Keep cardiograph, Patient Interface Module (PIM) and all cardiograph accessories away from liquids. Do not immerse cardiograph, PIM, or other accessories in any liquids.

WARNING **When using additional peripheral equipment powered from an electrical source other than the cardiograph, the combination is considered to be a medical system. It is the responsibility of the operator to comply with IEC 60601-1-1 and test the medical system according to the requirements. For additional information contact Philips Medical Systems.**

WARNING **Do not use non-medical peripherals within 1.83 meters or 6 feet of a patient unless the non-medical peripherals receive power from the cardiograph or from an isolation transformer that meets medical safety standards.**

WARNING **Always clean and disinfect reusable electrodes before patient use. Failure to properly clean and disinfect reusable electrodes before patient use may cause infectious materials to be transferred between patients.**

CAUTION The Welsh bulb electrodes contain natural rubber latex which may cause allergic reactions.

- When operating the cardiograph on AC power, ensure that the cardiograph and all other electrical equipment connected to or near the patient are effectively grounded.
- Use only grounded power cords (three-wire power cords with grounded plugs) and grounded electrical outlets. **Never** adapt a grounded plug to fit an ungrounded outlet by removing the ground prong. Use the equipotential post when redundant earth ground is necessary according to IEC 60601-1-1.
- If a safe ground connection is not ensured, operate the cardiograph on battery power only.

- The use of equipment that applies high frequency voltages to the patient (including electrosurgical equipment and some respiration transducers) is not supported and may produce undesired results. Disconnect the patient data cable from the cardiograph, or detach the leads from the patient prior to performing any procedure that uses high frequency surgical equipment.
- Do not perform ST analysis on the R/T ECG screen display or on Rhythm reports when the 0.5 Hz Baseline Wander filter is applied.
- If abnormal ECG data appears on the printed report, and the abnormal data does not have a physiological origin, perform the printer diagnostic test to assess printer performance.
- When printing a Rhythm report, there may be a slight delay before the Rhythm report begins to print on the cardiograph. Rhythm printing is not completed in real-time.
- Pace pulse tick marks will not print on an Auto ECG that uses simultaneous acquisition.
- Periodically inspect the patient data cable, lead wires, and AC power cord for any worn or cracked insulation to ensure that no inner conductive material is exposed. Discard worn accessories and replace them only with Philips Medical Systems accessories (see page 1-20).
- Keep the patient data cable away from power cords and any other electrical equipment. Failure to do so can result in AC power line frequency interference on the ECG trace.
- The Philips Medical Systems patient data cable (supplied with cardiograph) is an integral part of the cardiograph safety features. Use of any other patient data cable may compromise defibrillation protection, degrade cardiograph performance, and may result in distorted ECG data.
- Only qualified personnel may service the cardiograph or may open the cardiograph housing to access internal cardiograph components. Do not open any covers on the cardiograph. There are no internal cardiograph components that are serviced by the operator.
- Do not use this cardiograph near flammable anesthetics. It is not intended for use in explosive environments or in operating rooms.
- Do not touch the patient, the patient data cable, any unused patient leads, or the cardiograph during defibrillation. Death or injury may occur from the electrical shock delivered by the defibrillator.
- Always use electrode gel with reusable electrodes during defibrillation as ECG recovery will be greater than 10 seconds. Philips Medical Systems recommends the use of disposable electrodes at all times.
- Ensure that the electrodes or lead wires do not come in contact with any other conductive materials (including earth-grounded materials) especially when connecting or disconnecting electrodes to or from a patient.
- Connecting multiple medical electrical equipment to the same patient may pose a safety hazard due to the summation of leakage currents. Any combination of instruments should be evaluated by local safety personnel before being put into service.

- Portable medical equipment such as X-rays and MRI may produce electromagnetic interference that produces noise in the ECG signal. Move the cardiograph away from these potential sources of electromagnetic interference.
- Do not pull on the paper while an ECG report is being printed. This can cause distortion of the waveform and can lead to potential misdiagnosis.
- Only use the Philips Medical Systems AC power cord supplied with the cardiograph. Periodically inspect the AC power cord and AC power connector (rear of cardiograph, see page 1-15) to ensure that both are in a safe and operable condition. If the AC power cord or AC power connector is not in a safe or operable condition, operate the cardiograph on battery power and contact Philips Medical Systems for service.
- The cardiograph has been safety tested with the recommended accessories, peripherals, and leads, and no hazard was found when the cardiograph is operated with cardiac pacemakers or other stimulators.
- Do not connect any equipment or accessories to the cardiograph that are not manufactured or approved by Philips Medical Systems or that are not IEC 60601-1 approved. The operation or use of non-approved equipment or accessories with the cardiograph is not tested or supported, and cardiograph operation and safety are not guaranteed.
- The list of cables and other accessories with which Philips claims compliance with the emissions and immunity requirements of IEC standard 60601-1-2 are listed in “Supplies and Ordering Information” on page 1-20.
- Only install Philips Medical Systems software on the cardiograph. The installation or use of software not approved by Philips Medical Systems is strictly prohibited and cardiograph safety and performance are not guaranteed.
- Only use Philips Medical Systems replacement parts and supplies with the cardiograph. The use of non-approved replacement parts and supplies with the cardiograph is strictly prohibited. Cardiograph safety and performance are not guaranteed when non-approved replacement parts and supplies are used with the cardiograph.
- Manual measurements of ECG intervals and magnitudes should be performed on printed ECG reports only. Do not make manual measurements of ECG intervals and magnitudes on the R/T ECG display since these ECG representations are scaled.
- Only use patient electrodes that are approved by Philips Medical Systems. The use of non-approved patient electrodes may degrade cardiograph performance.
- The Philips Medical Systems warranty is applicable only if you use Philips Medical Systems approved accessories and replacement parts. See “Supplies and Ordering Information” on page 1-20 for more information.
- Before using the Patient Cable Arm with the cardiograph cart, properly install the counter weight on the cardiograph base.
- Only use the shielded LAN cable provided with the PageWriter Trim cardiograph, Philips part number 989803138021. Do not use any other LAN cables with the PageWriter Trim cardiograph. Use of unapproved LAN cables may result in radiated emissions that exceed the limit specified by CISPR11 Class B.

- The combined maximum weight that can be placed on the cardiograph cart shelf and the top surface of the cart cannot exceed 20 kg (44 lbs). Do not place more than the specified weight on the cardiograph top surface and shelf.
- Do not connect any device to the RS-232 port on the rear of the cardiograph when the patient data cable is connected to a patient.
- There are no cardiograph parts that can be sterilized.
- The cardiograph is not intended for direct, or invasive cardiac monitoring purposes.
- Excessive, repetitive use of the cardiograph keyboard and the cardiograph Trim Knob may result in a risk of developing carpal tunnel syndrome.
- Ensure that the patient data cable is tucked away from the cardiograph cart wheels when transporting the cardiograph. Ensure that the patient data cable does not present a hazard when pushing the cardiograph cart.
- For information on the standard IEC 60601-2-51, please see the document on the *PageWriter Trim Cardiograph User Documentation CD*, or go to the Philips InCenter web site (incenter.medical.philips.com). For information on using the Philips InCenter site, see page 1-26.
- The combined maximum weight that can be placed on the cardiograph cart shelf and the top surface of the cart cannot exceed 20 kilograms (44 pounds). Do not place more than the specified weight on the cardiograph top surface and shelf.
- Ensure that the patient data cable is tucked away from the cardiograph cart wheels when transporting the cardiograph. Ensure that the patient data cable does not present a hazard when pushing the cardiograph cart.

The PageWriter Trim Cardiograph

Intended Use

The intended use of the cardiograph is to acquire multi-channel ECG signals from adult and pediatric patients from body surface ECG electrodes and to record, display, analyze, and store these ECG signals for review by the user. The cardiograph is to be used in healthcare facilities by trained healthcare professionals. Analysis of the ECG signals is accomplished with algorithms that provide measurements, data presentations, graphical presentations, and interpretations for review by the user.

The interpreted ECG with measurements and interpretive statements is offered to the clinician on an advisory basis only. It is to be used in conjunction with the clinician's knowledge of the patient, the results of the physical examination, the ECG tracings, and other clinical findings. A qualified physician is asked to overread and validate (or change) the computer-generated ECG interpretation.

Indications for Use

The cardiograph is to be used where the clinician decides to evaluate the electrocardiogram of adult and pediatric patients as part of decisions regarding possible diagnosis, potential treatment, effectiveness of treatment, or to rule out causes for symptoms.

The Philips 12-Lead Algorithm

The PageWriter Trim Cardiograph software uses the Philips 12-Lead Algorithm. The algorithm in the software analyzes the morphology and rhythm on each of the 12 leads and summarizes the results. The set of summarized measurements is then analyzed by the clinically-proven ECG Analysis Program.

12-lead Reports may include or exclude ECG measurements, reasons, or analysis statements.

Intended Use

The intended use of the Philips 12-Lead Algorithm is to analyze multi-channel ECG signals from adult and pediatric patients with algorithms that provide measurements, data presentations, graphical presentations, and interpretations for review by the user.

The interpreted ECG with measurements and interpretive statements is offered to the clinician on an advisory basis only. It is to be used in conjunction with the clinician's knowledge of the patient, the results of the physical examination, the ECG tracings, and other clinical findings. A qualified physician is asked to overread and validate (or change) the computer-generated ECG interpretation.

Indications for Use

The Philips 12-Lead Algorithm is to be used where the clinician decides to evaluate the electrocardiogram of adult and pediatric patients as part of decisions regarding possible diagnosis, potential treatment, effectiveness of treatment, or to rule out causes for symptoms.

Features and Capabilities

The Philips PageWriter Trim family of cardiographs includes four product models: PageWriter Trim Rx, PageWriter Trim III, PageWriter Trim II, and PageWriter Trim I. Each cardiograph is designed to be economical, interpretive, and lightweight, and includes a remote digital patient module. The cardiograph contains the controls, the printer, and all the processing circuitry.

The features of the PageWriter Trim cardiographs include:

- Battery or AC operated
- Remote digital acquisition module with replaceable patient leads
- Capability for up to 12 leads

- Color or monochrome display as described in Table 1-2:

Table 1-2 PageWriter Trim Cardiograph Display by model

Model	Display
PageWriter Trim I	40 x 2 character LCD
PageWriter Trim II	640 x 480 monochrome LCD
PageWriter Trim III	640 x 480 color LCD
PageWriter Trim Rx	640 x 480 color LCD

- Export and import of ECG data in XML format to a TraceMasterVue ECG Management System by modem transmission, or by LAN or wireless LAN connection as described in Table 1-3:

Table 1-3 PageWriter Trim ECG data transmission options by model

Model	Modem	LAN	WLAN
PageWriter Trim I			
PageWriter Trim II	✓ **	✓ **	
PageWriter Trim III	✓ **	✓	✓
PageWriter Trim Rx	✓	✓	✓

** *Optional feature*

- Optional cart with convenient storage areas for supplies

Capabilities

- Downloads patient data from HIS with a barcode, magnetic card swipe, or Smart Card swipe
- Stores ECGs on a removable PCMCIA card or USB memory stick
- Transmits ECGs by FAX, PCMCIA-modem, LAN, or wireless LAN

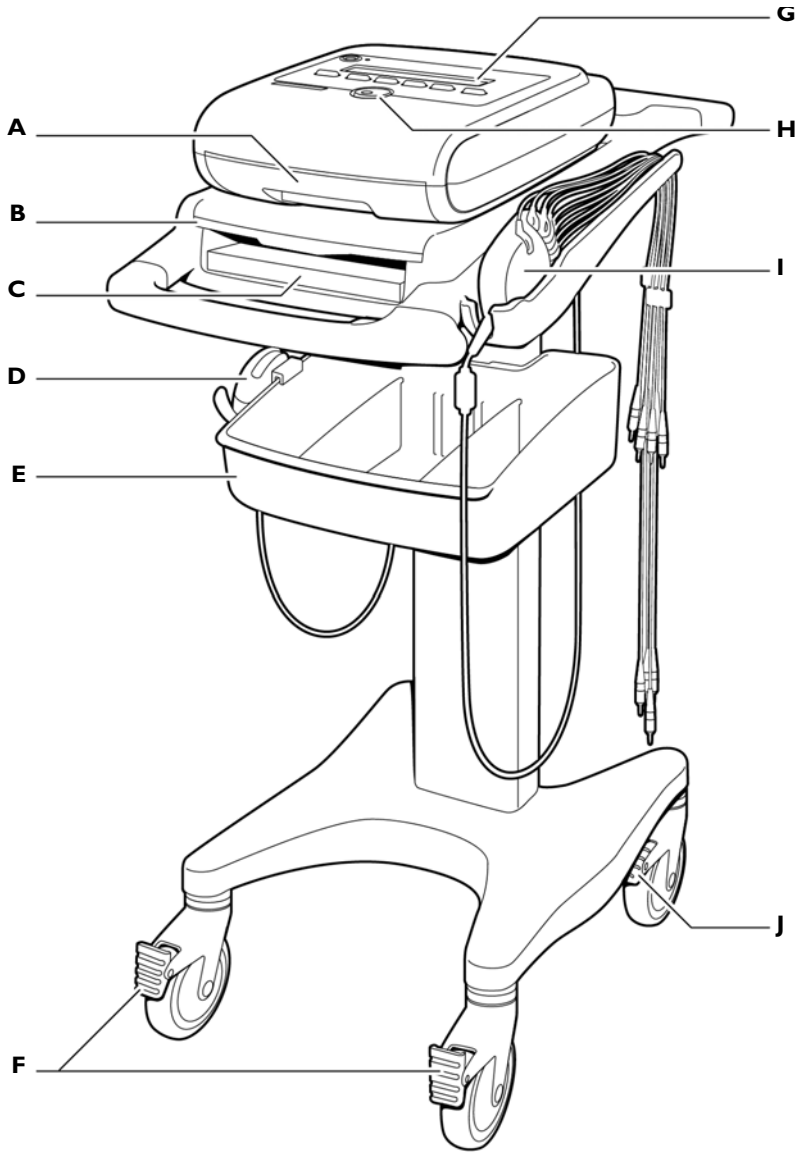
Tour of PageWriter Trim Cardiographs

This section gives an overview of the exterior of the cardiograph, as well as the Patient Interface Module (PIM). For more information, see the *PageWriter Trim Instructions for Use*.

PageWriter Trim I Cardiograph

The following section shows front and rear views of the PageWriter Trim I cardiograph.

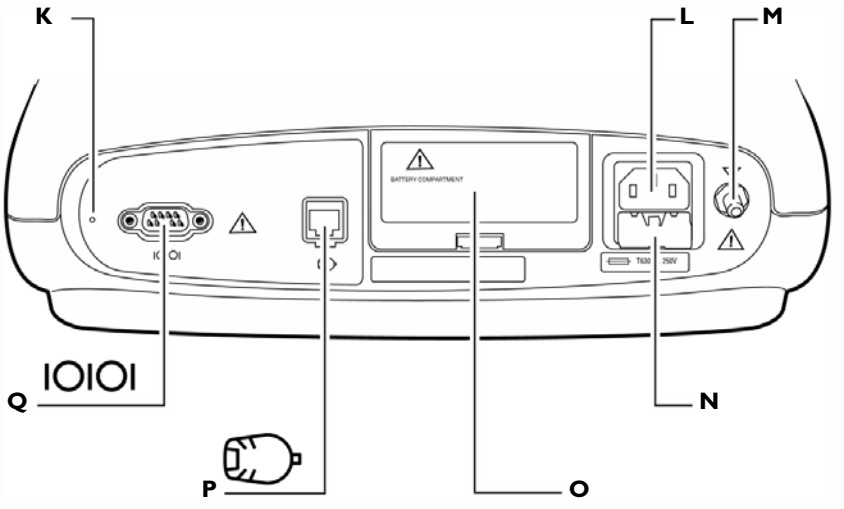
Figure 1-1 PageWriter Trim I Cardiograph and Cart (Front View)



A Printer paper drawer
B Slide out shelf
C Printer paper/report storage slot
D Optional barcode reader in holder
E Storage bin
F Wheel positioners
G Control panel
H Trim Knob
I Patient Interface Module (PIM)
J Wheel brake

CAUTION Always lock the wheel brake (**J**) when the cart is not in use. Press down on the wheel brake to set or to release the wheel brake.

Figure 1-2 PageWriter Trim I Cardiograph (Rear View)



K Reset button

L AC power cord connector

M Equipotential post

N Fuse door

O Battery door

P PIM connector

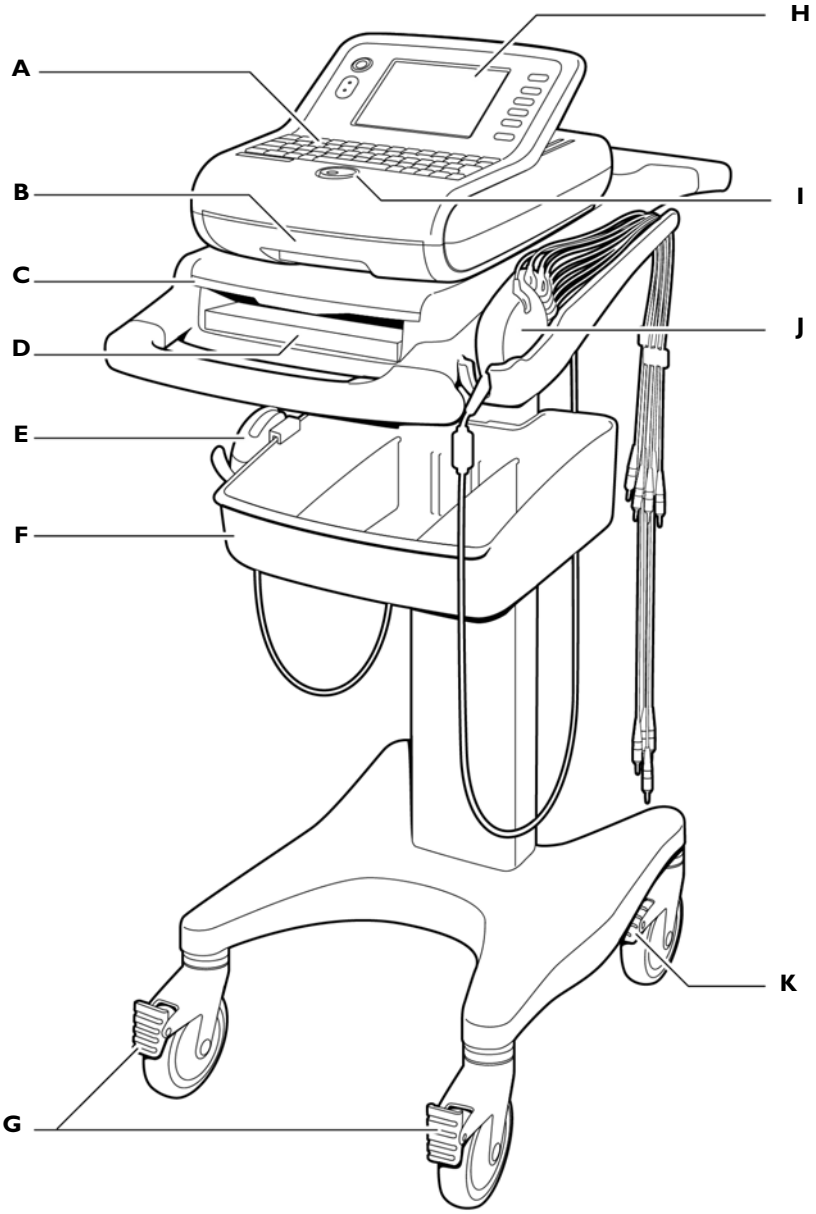
Q Serial connector (not supported)

WARNING **Do not connect a LAN cable connector to the PIM connector.**
Do not plug a telephone connector into the PIM connector.

PageWriter Trim II, III, and Rx Cardiographs

The following section shows front and rear views of the PageWriter Trim II, III, and Rx cardiographs.

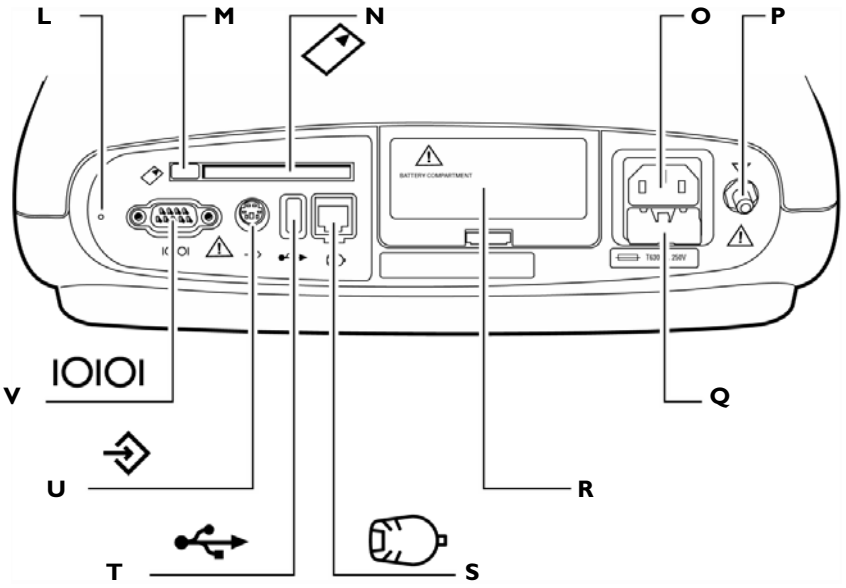
Figure 1-3 PageWriter Trim II, III, and Rx Cardiograph and Cart (Front View)



A Keyboard
B Printer paper drawer
C Slide out shelf
D Printer paper/report storage slot
E Optional barcode reader in holder
F Storage bin
G Wheel positioners
H Display screen
I Trim Knob
J Patient Interface Module (PIM)
K Wheel brake

CAUTION Always lock the wheel brake (**K**) when the cart is not in use. Press down on the wheel brake to set or to release the wheel brake.

Figure 1-4 PageWriter Trim II, III, and Rx Cardiograph (Rear View)



L Reset button

M PC card eject button

N PC card slot

O AC power connector

P Equipotential post

Q Fuse door

R Battery door

S PIM connector

T Smart Card Reader or USB memory stick connector

U Barcode reader or magnetic card reader connector

V Serial connector (not supported)

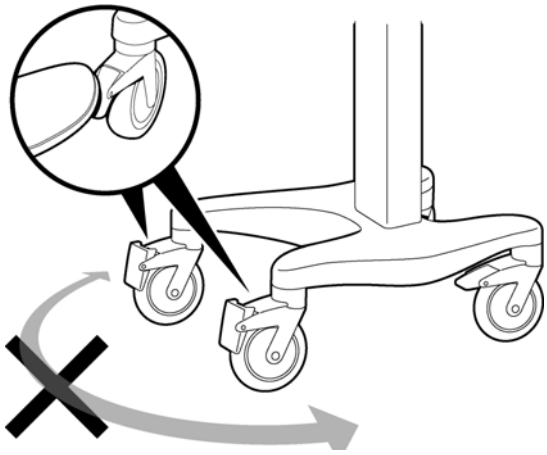
WARNING **Do not connect the LAN cable connector into the PIM connector. Do not plug a telephone connector into the PIM connector.**

Using the Cart Wheel Positioners and Brake

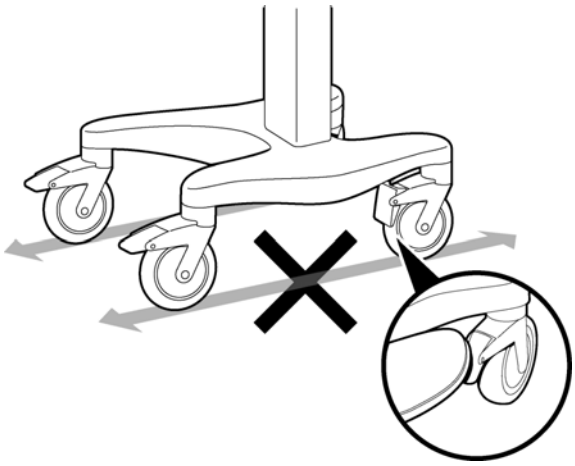
The cart includes one wheel brake and two wheel positioners. Lock the wheel positioners at all times when using the cart. The wheel positioners keep the cart straight when moving forward or backward, or when turning corners. The wheel positioners also help the cart maneuver in tight spaces.

To use the cart wheel positioners and brake:

1 Align the front wheels so that they are straight. Step on both wheel positioners. Move the cart forward until the wheels lock into position. The cart will move forward or backward in a straight line.



2 Step on the gray rear wheel brake to lock the cart wheels. The cart will not move. Step on the wheel brake again to unlock the wheels.



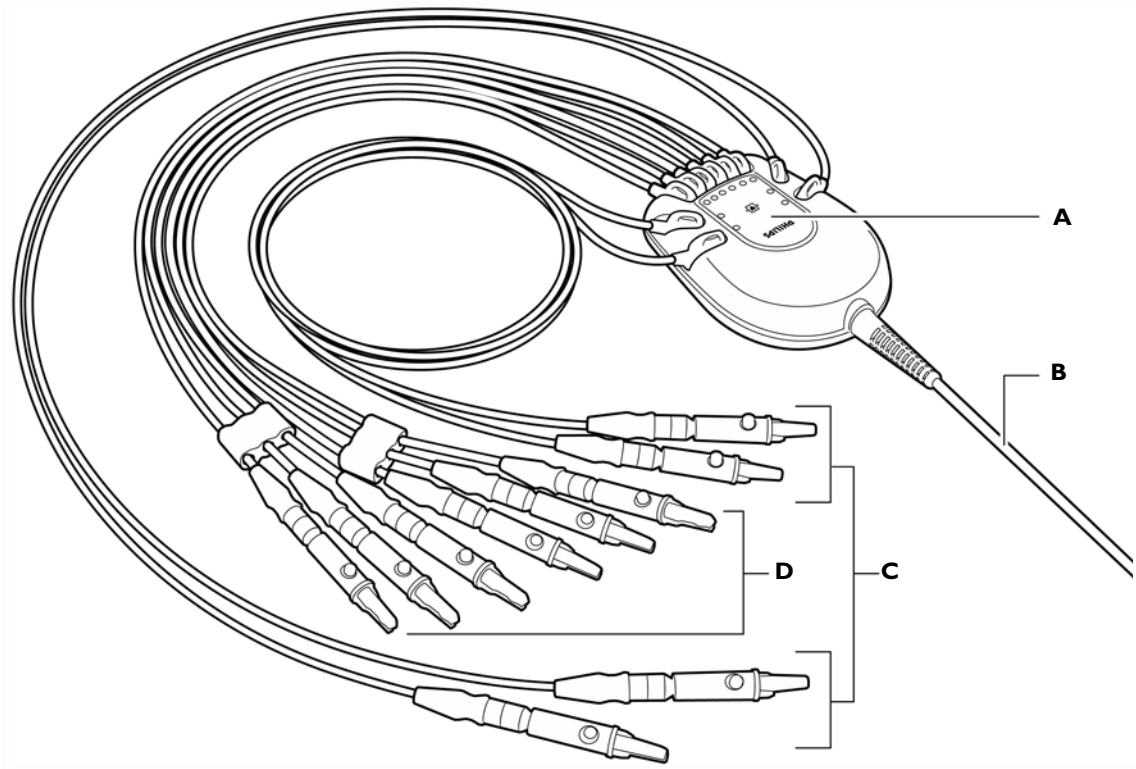
Patient Interface Module (PIM)

The Patient Interface Module (PIM) is a hand-held device that connects to the cardiograph. The lead wires on the PIM attach to the electrodes placed on the patient. The exterior of the PIM is labeled for quick and easy lead identification.

The PIM connects to the patient data cable and to the lead wires attached to the patient. See Figure 1-5 on the following page.

For details about connecting the lead wires to the PIM, see the *PageWriter Trim Instructions for Use*.

Figure 1-5 Patient Interface Module



A Lead wire labeling

B Patient data cable

C Limb lead wires

D Precordial (chest) lead wires

General Service Information

Keep the following points in mind when servicing this product.

Installation

The PageWriter Trim cardiographs do not require installation by Philips field personnel. The cardiograph can be installed by the customer. See Chapter 1 “Getting Started” and 2 “Configuration” of the *PageWriter Trim Instructions for Use* or the *PageWriter Trim Rx*

Instructions for Use for information on the proper setup and configuration of the cardiograph and cart system.

NOTE There are no configurable features for the PageWriter Trim I cardiograph.

Upgrades and Accessories

Upgrades and cardiograph accessories are available to add specific functionality to the device. The standard upgrades and available accessories are listed in Table 1-4 and in Table 1-5.

Table 1-4 PageWriter Trim II, III, and Rx Cardiograph Accessories

Part Number	Description
989803129931	Barcode Reader
989803129941	Magnetic Card Reader
989803127331	PC Card
989803129961	Smart Card Reader
989803142041	Wireless LAN Card
989803129951	LAN PCMCIA Network Card
989803145331	USB Memory Stick
989803149571	Patient Cable Arm for Cardiograph Cart
989803127461	Modem Card (USA and Canada only)
989803138021	LAN Cable

Table 1-5 PageWriter Trim Cardiograph Upgrades

Part Number	Option	Description
860320		PageWriter Trim Cardiograph Cart
860302		PageWriter Trim II Cardiograph Upgrade Options
	B01	ECG Interpretation Upgrade Option
	B02	LAN Connectivity Upgrade Option
860303		PageWriter Trim III Cardiograph Upgrade Options
	B02	LAN Connectivity Upgrade Option
	B03	Wireless LAN Connectivity Options (802.11b compliant)
860299		PageWriter Trim Rx Cardiograph Upgrade Options
	B02	LAN Connectivity Upgrade Options

Table 1-5 PageWriter Trim Cardiograph Upgrades *(continued)*

Part Number	Option	Description
	B03	Wireless LAN Connectivity Options (802.11b compliant)
860304		PageWriter Trim Cardiograph External Battery Charger
	AXX	Localization Code (refer to Table 1-11, "PageWriter Trim I, II, III and Rx Country and Region Options," on page 1-23 for the correct localization option code for your country or region)
	B01	Additional Battery for the PageWriter Trim Cardiograph (any model)

Consult your sales representative, dealer, or distributor for the latest details.

PageWriter Trim II, III and Rx Token Label

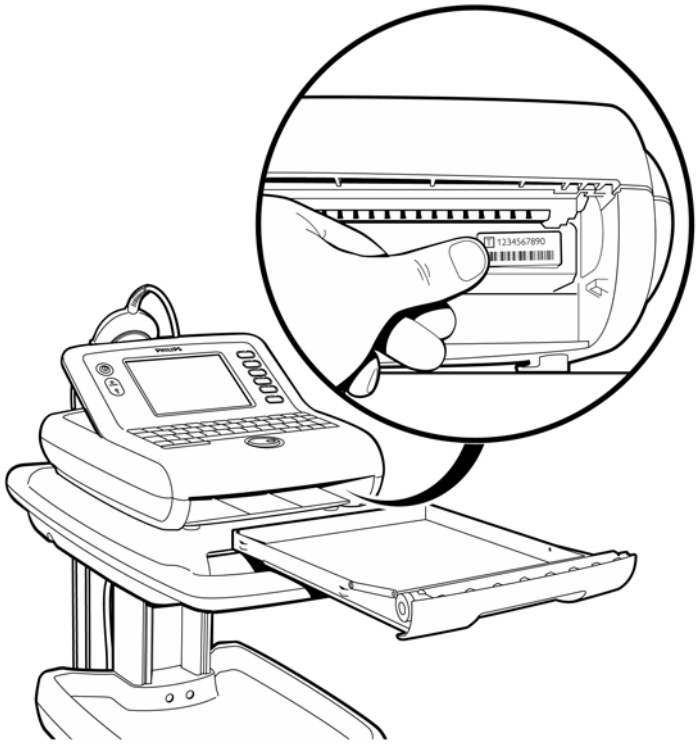
Each cardiograph manufactured after January of 2006 has a token number assigned to it, and is shipped from the factory with a token label installed on the unit. See Figure 1-7 on page 1-20 for the location of the token label on the cardiograph. And, any cardiograph with installed software version A.01.00 or higher (regardless of manufacture date) must have an active token number assigned to it in order to operate. If upgrading from software version A.00.03 to A.01.01 or higher, or following a repair that necessitates upgrading the cardiograph software to version A.01.01 or higher, a token number is required in order to complete the software upgrade or repair procedure. For information on obtaining a token number in order to complete a software upgrade procedure, contact the nearest Philips Response Center. See "Contacting a Philips Response Center" on page 1-32 for a listing of contact telephone numbers.

The token label contains the unique token number assigned to the cardiograph, and is affixed to the inside of the paper tray. To locate the token label, remove the paper tray from the cardiograph. The label is located on the far right side of the metal housing. Always ensure that the current token label is affixed to the cardiograph to help facilitate the servicing or troubleshooting of the unit.

NOTE There are no token numbers assigned to the PageWriter Trim I cardiograph.

Figure 1-6 PageWriter Trim II, III, Rx Cardiograph Token Label

Figure 1-7 Location of Token Label on Cardiograph



Managing Token Labels

Each upgrade option available for purchase is enabled by a unique token number that is provided with the upgrade kit. Each time that a new option is purchased for the cardiograph, the new token number must be entered on the cardiograph, and the new token label must be affixed to the cardiograph in the specified location to facilitate future servicing and troubleshooting. For information on enabling and installing an optional upgrade, see “Upgrade Kit Installation” on page E-2.

Supplies and Ordering Information

The part numbers for all supplies for the PageWriter Trim I/II/III/Rx cardiographs are listed in this section.

You can order all supplies on the World Wide Web at

http://shop.medical.philips.com

Special Note about Welsh Bulb Electrodes

Figure 1-8 Welsh Bulb Electrode

Welsh Bulb electrodes are offered as an optional supply part with all models of the PageWriter Trim cardiograph. Special care is necessary when using these electrodes. Pay special attention to all warnings associated with these electrodes. For information on cleaning the reusable Welsh Bulb electrodes, see “Reusable Electrode Cleaning” on page 3-3. Philips Medical Systems recommends the use of disposable electrodes with all models of the PageWriter Trim cardiograph.

WARNING **The Welsh bulb electrodes (available as an accessory for the cardiograph) do not meet the requirements of IEC 60601-2-25 for defibrillation recovery time, and cannot be reliably used for immediate patient diagnosis following defibrillation.**

WARNING **Always clean and disinfect reusable electrodes before patient use. Failure to properly clean and disinfect reusable electrodes before patient use may cause infectious materials to be transferred between patients.**

CAUTION The Welsh bulb electrodes contain natural rubber latex which may cause allergic reactions.

Use the part numbers listed in this section for reference to ensure that the correct supplies are ordered.

Table 1-6 Complete Lead Sets

Part Number	Description
989803129161	Complete Lead Set (AAMI)
989803129191	Complete Lead Set (IEC)

Table 1-7 Replacement Lead Sets and Accessories

Part Number	Description
989803129141	Limb Lead Set, 99 cm/39 in (AAMI)
989803129151	Chest Lead Set, 61 cm/24 in (AAMI)
989803129171	Limb Lead Set, 99 cm/39 in (IEC)
989803129181	Chest Lead Set, 61 cm/24 in (IEC)

Table 1-7 Replacement Lead Sets and Accessories *(continued)*

Part Number	Description
989803129201	Long Limb Lead Set, 137 cm/54 in (IEC)
989803129211	Long Chest Lead Set, 99 cm/39 in (IEC)
989803129221	Long Complete Lead Set (IEC)
989803129231	Alligator Clips for Disposable Tab Electrodes (AAMI)
989803129241	Alligator Clips for Disposable Tab Electrodes (IEC)

Table 1-8 Electrodes and Connectors

Part Number	Description
989803101361	Alligator Clip Extender for Disposable Tab Electrodes (10 total per pack) (AAMI)
989803101371	Alligator Clip Extender for Disposable Tab Electrodes (10 total in pack) (IEC)
989803106061	Wide Disposable Tab Electrode Connector (10 total per pack) (AAMI/IEC)
989803101691	Adult Limb Clamp Electrode (4 total in pack) (AAMI/IEC)
989803100441	Disposable cardiography electrode, resting diagnostic ECG
989803106051	Disposable electrode, adult, resting ECG (not available in Japan)
989803149901	Pediatric disposable tab electrode
989803100461	Wet Gel Foam Electrode, resting ECG
989803101311	15 mm diameter Welsh Bulb Electrode (AAMI)
989803101651	15 mm diameter Welsh Bulb Electrode (IEC) with banana plug adapter

Table 1-9 Printer Paper

Part Number	Description
M3707A	Thermal Paper (100 sheets), A size (8.5 x 11 in/21.6 x 28 cm)
M3708A	Thermal Paper (100 sheets), A4 size (8.27 x 11.69 in/21 x 29.69 cm)

Table 1-10 Battery

Part Number	Description
989803130151	Battery

Preventive Maintenance

The PageWriter Trim cardiograph does not require scheduled preventive maintenance.

Preventive maintenance and periodic operational checks are intended to be performed by the user. Both topics are covered in the Cardiograph Care and Maintenance chapter of the *PageWriter Trim Instructions for Use* and this service manual. If further technical assistance is required, contact the nearest Philips Response Center. See "Contacting a Philips Response Center" on page 1-32.

Repair Philosophy

The repair philosophy of the PageWriter Trim cardiograph and Patient Interface Module (PIM) is subassembly replacement. Examples of subassemblies are: print-head assembly, LCD, the main Processor Circuit Assembly (PCA), the power supply board, the power module, the PIM PCA sets, and the printer drawer.

CAUTION Only Philips authorized personnel can repair this product. Repairs by users that involve replacing subassemblies and components are not supported or authorized, and attempting to perform internal repairs on the cardiograph may void conditions of the product warranty.

Country/Region Options

Country and region options include the appropriate keyboard, power cord, printer paper, patient leads, and language. The following table lists the configuration options for specific countries and regions.

Table 1-11 PageWriter Trim I, II, III and Rx Country and Region Options

Option Code	Country/ Region	User Interface	Lead Standard	Keyboard	PIM/ Lead Version	Power Cord Opt.	Default Paper Size
AB0	Taiwan	Traditional Chinese	English	US English	AAMI	8120-5429	A
AB2	China	Simplified Chinese	Chinese	US English	IEC	8120-8376	A4
AB4	Singapore & Hong Kong	English	English	US English	AAMI	8120-1351	A4
AB9	Portugal	Portu-guese (Brazilian)	Portu-guese	European	IEC	8120-1689	A4

Table 1-11 PageWriter Trim I, II, III and Rx Country and Region Options *(continued)*

Option Code	Country/ Region	User Interface	Lead Standard	Keyboard	PIM/ Lead Version	Power Cord Opt.	Default Paper Size
ABA	USA/ Canada (English)	English	English	US English	AAMI	8120-5429	A
ABB	European English	English	English	European English	IEC	8120-1689	A4
ABB	Romania English	English	English	European English	IEC	8120-1689	A4
ABC	Canada (French)	French	French	European	AAMI	8120-5429	A
ABD	Germany	German	German	European	IEC	8120-1689	A4
ABE	Spain	Spanish	Spanish	European	IEC	8120-1689	A4
ABF	France	French	French	French	IEC	8120-1689	A4
ABG	Australia	English	English	US English	AAMI	8120-4475	A4
ABH	Nether-lands	Dutch	Dutch	US English	IEC	8120-1689	A4
ABM	Latin American	Spanish	Spanish	European	AAMI	8120-5429	A
ABN	Norway	Norwegian	Norwe-gian	European	IEC	8120-1689	A4
ABS	Sweden	Swedish	Swedish	European	IEC	8120-1689	A4
ABU	UK	English	English	US English	IEC	8120-1351	A4
ABX	Finland	Finnish	Finnish	European	IEC	8120-1689	A4
ABZ	Italy	Italian	Italian	European	IEC	8120-6978	A4
AC4	Brazil	Portuguese	Portu-guese	European	AAMI	8120-5429	A

Table 1-11 PageWriter Trim I, II, III and Rx Country and Region Options *(continued)*

Option Code	Country/ Region	User Interface	Lead Standard	Keyboard	PIM/ Lead Version	Power Cord Opt.	Default Paper Size
AC6	South Korea	English	Korean	US English	AAMI		A4
AC8	Argentina	Spanish	Spanish	European	AAMI	8120-6869	A
ACB	Russia	English	English	European	IEC	8120-1689	A4
ACE	Denmark & Faroe Islands	Danish	Danish	European	IEC	8120-4933	A4
ACJ	India	English	English	US English	IEC	8120-4211	A4
AKB	Czech Republic	English	English	European	IEC	8120-1689	A4
AKD	Poland	English	English	European	IEC	8120-1689	A4
AKJ	Israel & Gaza Strip	English	English	US English	IEC	8120-5182	A4
AKR	Slovak Republic	English	English	European	IEC	8120-1689	A4
AKV	Chile & others	Spanish	Spanish	European	AAMI	8120-6978	A
AR0*	Japan	Japanese	Japanese	Japanese	IEC	8120-5429	A4
AR2	Greece	English	English	European	IEC	8120-1689	A4
ARF	Hungary	English	English	European	IEC	8120-1689	A4

*. The Japanese AR0 option is no longer available. The supported software revision level for this localization option is A.00.03. There is no software upgrade path for this localization option.

Philips 12-Lead ECG XML Information and Tools

The PageWriter Trim II, III, and Rx model cardiographs export 12-lead ECG data in XML (Extensible Markup Language) format. The XML schema for the Philips 12-lead ECG files, and a complementary suite of XML utilities and tools are available for download from the Philips InCenter web site. An *XML Utility Suite Instructions for Use* is also available for download. This *Instructions for Use* describes how to install and configure the XML utilities. Check the InCenter site regularly for documentation updates, and for further information and updates to the XML Utility Suite.

NOTE The PageWriter Trim I cardiograph does not support exporting ECG data.

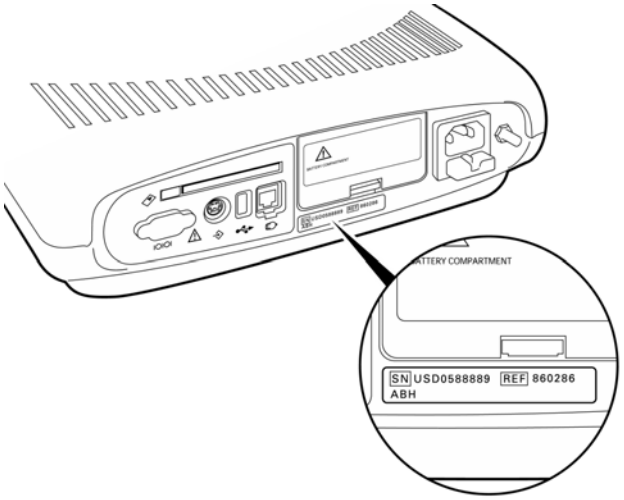
Using the Philips InCenter Site

The Philips InCenter site provides frequent updates to all Philips Cardiac Systems product documentation and product software, including the PageWriter Trim cardiographs.

The Philips InCenter site requires an active registration and password. To register, go to the InCenter site at: incenter.medical.philips.com and click on the **Need help?** link on the main page. On the following E Support page, click the **Click here for access to software updates and documentation for cardiology products** link located on the right side of the page. The Cardiac Systems InCenter Registration page appears. Complete all of the information fields on the page to receive a login and password for the InCenter site.

Registration for the InCenter site requires the serial number(s) for all PageWriter Trim cardiographs in active use at your facility. The serial number is found on the product identification label. The product identification label is located on the rear panel of the cardiograph below the battery door. The serial number is listed next to the text **SN**.

Figure 1-9 Serial Number on Product Identification Label



About Adobe Acrobat Versions

Adobe Acrobat Reader version 8.0 must be installed on the PC that is used to access the Philips InCenter site. Previous versions of Acrobat Reader are not compatible with the Philips

InCenter site, and attempting to access InCenter with a previous version of Acrobat Reader will result in error messages when opening documents. Uninstall all previous versions of Acrobat Reader, and then proceed for a free install of Acrobat Reader 8.0 at: www.adobe.com.

Any version of Adobe Acrobat Professional or Acrobat Elements are also not compatible with the Philips InCenter site, and error messages will appear when opening documents with these applications. Acrobat Reader 8.0 must be installed in addition to Acrobat Professional or Acrobat Elements.

Follow this procedure when accessing documents on the Philips InCenter site.

To access documents on the Philips InCenter site:

1. Exit Acrobat Professional or Acrobat Elements (if open).
2. Start Acrobat Reader 8.0.
3. Open Internet Explorer, and go to the Philips InCenter site. Keep Acrobat Reader 8.0 open the entire time while accessing the InCenter site.

PageWriter Trim Cardiograph Learning Product Part Numbers

The following tables list all of the PageWriter Trim Cardiograph Learning Product part numbers by language for the I, II, III, and Rx model cardiographs.

All of the following Learning Products are available for download from the Philips InCenter web site at: http://incenter.medical.philips.com. Users must register with the InCenter web site before accessing materials on the site. Information on registering for the site is found on the InCenter homepage. For more information on using the Philips InCenter site, see page 1-26.

Learning Products may also be downloaded from the Philips Medical Systems Documentation & Downloads site at: http://www.medical.philips.com/goto/productdocumentation. Select **Cardiology** from the **Product Downloads** menu (top of screen). The Cardiology Documentation & Downloads screen appears. Select the applicable product from the left menu bar. This web site is available to all customers.

NOTE The PageWriter Trim Interactive Training Program is only available in English for the PageWriter Trim I, II, and III model cardiographs, and is only available for download from the Philips InCenter site.

Table 1-12 English Learning Product Part Numbers

Part Number	Title	Language
M4992-91903	PageWriter Trim I, II, III Interactive Training Program	English
M4992-91181	PageWriter Trim I, II, III Quick Help Card	English
M4992-91164	PageWriter Trim I, II, III Getting Started Guide	English
M4992-91150, Edition 4	PageWriter Trim I, II, III Instructions for Use	English
453564065311	PageWriter Trim I, II, III, Rx Product Update Addendum	English

Table 1-12 English Learning Product Part Numbers *(continued)*

Part Number	Title	Language
M5000-91000	Philips 12-lead Algorithm Physician's Guide	English
M4994-91120, Edition 2	PageWriter Trim Rx Quick Help Card	English
M4994-91100	PageWriter Trim Rx Instructions for Use	English
M4994-91140	PageWriter Trim Rx Getting Started Guide	English
453564051211	Installing TraceMasterVue and Configuring Cardiograph Communication	English
453564038681, Edition 2	Using OrderVue with PageWriter Cardiographs	English
453564057671	OrderVue Web Select Utility Quick Help Card	English
453564034061	XML Utility Suite Instructions for Use	English

Table 1-13 Czech Learning Product Part Numbers

Part Number	Title	Language
M4992-91182	PageWriter Trim I, II, III Quick Help Card	Czech
M4992-91172	PageWriter Trim I, II, III User's Guide	Czech

Table 1-14 Danish Learning Product Part Numbers

Part Number	Title	Language
M4992-91183	PageWriter Trim I, II, III Quick Help Card	Danish
M4992-91963	PageWriter Trim I, II, III Instructions for Use	Danish

Table 1-15 Dutch Learning Product Part Numbers

Part Number	Title	Language
453564087181	PageWriter Trim I, II, III Quick Help Card	Dutch
M4992-91165	Getting Started Guide	Dutch
M4992-91153	PageWriter Trim I, II, III Instructions for Use	Dutch
M5000-91003	Philips 12-Lead Algorithm Physician's Guide	Dutch

Table 1-16 Finnish Learning Product Part Numbers

Part Number	Title	Language
M4992-91185	PageWriter Trim I, II, III Quick Help Card	Finnish
M4992-91964	PageWriter Trim I, II, III Instructions for Use	Finnish

Table 1-17 French Learning Product Part Numbers

Part Number	Title	Language
453564087191	PageWriter Trim I, II, III Quick Help Card	French
M4992-91166	Getting Started Guide	French
M5000-91001	Philips 12-Lead Algorithm Physician's Guide	French
M4992-91151	PageWriter Trim I, II, III Instructions for Use	French

Table 1-18 German Learning Product Part Numbers

Part Number	Title	Language
453564087201	PageWriter Trim I, II, III Quick Help Card	German
M4992-91167	Getting Started Guide	German
M5000-91001	Philips 12-Lead Algorithm Physician's Guide	German
M4992-91151	PageWriter Trim I, II, III Instructions for Use	German

Table 1-19 Greek Learning Product Part Numbers

Part Number	Title	Language
M4992-91188	PageWriter Trim I, II, III Quick Help Card	Greek
M4992-91173	User's Guide	Greek

Table 1-20 Hungarian Learning Product Part Numbers

Part Number	Title	Language
M4992-91189	PageWriter 2 I, II, III Quick Help Card	Hungarian
M4992-91174	User's Guide	Hungarian

Table 1-21 Italian Learning Product Part Numbers

Part Number	Title	Language
453564087211	PageWriter Trim I, II, III Quick Help Card	Italian
M4992-91168	Getting Started Guide	Italian
M5000-91005	Philips 12-Lead Algorithm Physician's Guide	Italian
M4992-91155	PageWriter Trim I, II, III Instructions for Use	Italian

Table 1-22 Norwegian Learning Product Part Numbers

Part Number	Title	Language
M4992-91191	PageWriter Trim I, II, III Quick Help Card	Norwegian

Table 1-22 Norwegian Learning Product Part Numbers *(continued)*

Part Number	Title	Language
M4992-91965	PageWriter Trim I, II, III Instructions for Use	Norwegian

Table 1-23 Polish Learning Product Part Numbers

Part Number	Title	Language
M4992-91192	PageWriter Trim I, II, III Quick Help Card	Polish
M4992-91175	PageWriter Trim I, II, III User's Guide	Polish

Table 1-24 Portuguese Learning Product Part Numbers

Part Number	Title	Language
453564087221	PageWriter Trim I, II, III Quick Help Card	Portuguese
M4992-91169	Getting Started Guide	Portuguese
M5000-91006	Philips 12-Lead Algorithm Physician's Guide	Portuguese
M4992-91163	PageWriter Trim I, II, III Instructions for Use	Portuguese

Table 1-25 Romanian Learning Product Part Numbers

Part Number	Title	Language
M4992-91961	PageWriter Trim I, II, III Quick Help Card	Romanian
M4992-91962	PageWriter Trim I, II, III User's Guide	Romanian

Table 1-26 Russian Learning Product Part Numbers

Part Number	Title	Language
M4992-91194	PageWriter Trim I, II, III Quick Help Card	Russian
M4992-91176	PageWriter Trim I, II, III User's Guide	Russian

Table 1-27 Simplified Chinese Learning Product Part Numbers

Part Number	Title	Language
453564078871	PageWriter Trim I, II, III Quick Help Card	Simplified Chinese
M5000-91135	Philips 12-Lead Algorithm Physician's Guide	Simplified Chinese
M4992-91956	PageWriter Trim I, II, III Instructions for Use	Simplified Chinese

Table 1-28 Slovak Learning Product Part Numbers

Part Number	Title	Language
M4992-91196	PageWriter Trim I, II, III Quick Help Card	Slovak

Table 1-28 Slovak Learning Product Part Numbers *(continued)*

Part Number	Title	Language
M4992-91177	PageWriter Trim I, II, III User's Guide	Slovak

Table 1-29 Spanish Learning Product Part Numbers

Part Number	Title	Language
453564083051	PageWriter Trim I, II, III Quick Help Card	Spanish
M4992-91158	Getting Started Guide	Spanish
M5000-91004	Philips 12-Lead Algorithm Physician's Guide	Spanish
M4992-91154	PageWriter Trim I, II, III Instructions for Use	Spanish

Table 1-30 Swedish Learning Product Part Numbers

Part Number	Title	Language
M4992-91198	PageWriter Trim I, II, III Quick Help Card	Swedish
M4992-91966	PageWriter Trim I, II, III Instructions for Use	Swedish

Table 1-31 Traditional Chinese Learning Product Part Numbers

Part Number	Title	Language
M4992-91199	PageWriter Trim I, II, III Quick Help Card	Traditional Chinese
M4992-91171	Getting Started Guide	Traditional Chinese
M4992-91136	Philips 12-Lead Algorithm Physician's Guide	Traditional Chinese
M4992-91162	PageWriter Trim I, II, III Instructions for Use	Traditional Chinese

Table 1-32 Turkish Learning Product Part Numbers

Part Number	Title	Language
453564086371	PageWriter Trim I, II, III User's Guide	Turkish
453564086381	PageWriter Trim I, II, III Quick Help Booklet	Turkish

Contacting a Philips Response Center

The Philips Response Center can assist with product troubleshooting and provide technical expertise to help with any issue with the PageWriter Trim cardiograph or any of its accessories.

For more information on the Philips Response Center go to:

www.medical.philips.com/main/services/response_center

North America Response Centers

Country	Telephone Number
Canada	(800) 323 2280
Mexico	01 800 710 8128
Puerto Rico	1 787 754 6811
United States	(800) 722 9377

South America Response Centers

Country	Telephone Number
Argentina	54 11 4546 7698
Brazil	0800 701 7789
Chile	0800 22 3003
Columbia	01 8000 11 10 10
Peru	51 1 620 6440

Europe Response Centers

Country	Telephone Number
United Kingdom	44 0870 532 9741 Fax: 44 01737 23 0550
Austria	43 1 60101 820
Belgium	32 2 525 7102 (French) 32 2 525 7103 (Flemish)
Czech Republic MCR Response Center (located in The Netherlands)	31 40 2781619
Denmark	45 80 30 30 35
Finland	358 615 80 400

Europe Response Centers *(continued)*

Country	Telephone Number
France	0 810 835 624
Germany	0180 5 47 5000
Greece MCR Response Center (located in The Netherlands)	31 40 2781619
Hungary MCR Response Center (located in The Netherlands)	31 40 2781619
Italy	0800 232100
Netherlands	31 40 27 211 27
Norway	47 800 84 080
Poland MCR Response Center (located in The Netherlands)	31 40 2781619
Rumania MCR Response Center (located in The Netherlands)	31 40 2781619
Russia MCR Response Center (located in The Netherlands)	31 40 2781619
Slovak Republic MCR Response Center (located in The Netherlands)	31 40 2781619
Spain	34 90 230 4050
Sweden	46 200 81 00 10
Switzerland	0800 80 3000 (German) 0800 80 3001 (French)

Asia Response Centers

Country	Telephone Number
Australia	1800 251 400
China	800 810 0038
Hong Kong	852 2876 7578
India	1600 112 444
Indonesia	62 21 7910040, ext 8610
Japan	81 (0)120 095 205

Asia Response Centers *(continued)*

Country	Telephone Number
Korea	82 (0)2 3445 9010
Malaysia	1800 886 188
New Zealand	0800 251 400
Philippines	63 2 8162617 ext. 875
Singapore	1800 Philips
Taiwan	0800 005 616
Thailand	66 (0)2 614 3569

Africa and Middle East

Country	Telephone Number
All countries MCR Response Center (located in The Netherlands)	31 40 2781619

2

Theory of Operation

Overview

At a system level, the PageWriter Trim cardiograph performs acquisition, analysis, printing, storage, and transfer of ECG waveforms and other patient clinical data.

The PageWriter Trim cardiograph consists of three major subsystems:

- *Main controller*

  An Intel StrongArm-base single-board computer (SBC) with extensive I/O facilities, running Windows CE 4.1. The PageWriter Trim application software runs on the main controller, which includes the display and user-input subsystems.

- *Print controller*

  A Motorola Coldfire-based control circuit, embedded in the main controller board that provides all the real-time management of the printer. The print controller communicates with the main controller through USB.

- *Patient Interface Module (PIM)*

  An Intel StrongArm-based controller running Windows CE 4.1, coupled with a signal acquisition board employing Philips proprietary mixed-signal ASIC technology for ECG acquisition. The PIM communicates with the main controller through USB.

Hardware Logical View

Control of the PageWriter Trim cardiograph is provided by application software running on the main control board, interacting with numerous hardware and software subsystems. The following are high-level descriptions of these various subsystems.

Main Control Board

The main control board contains loader software and the Windows CE kernel image in its internal flash memory (32 MB for PageWriter Trim II, III, Rx; 16 MB for PageWriter Trim I).

At system boot, a system RAM test is performed by the loader (onboard RAM is 64 MB), and then the Windows CE kernel loads. When Win CE loads, the application launcher runs, verifying system and executable images before loading the main application. For PageWriter Trim II/III/Rx, all interaction with the operator is through the Ruby300_APP application. For PageWriter Trim I, all interaction with the operator is through the Ruby100_APP application. The application software is stored in internal Flash memory.

The PageWriter Trim II, III and Rx cardiographs each have an internal ECG archive that consists of a CompactFlash (CF) card installed on the main control board. The number of ECGs that can be stored to this internal memory varies by cardiograph model as shown in the following table.

NOTE The PageWriter Trim I cardiograph does not provide internal storage.

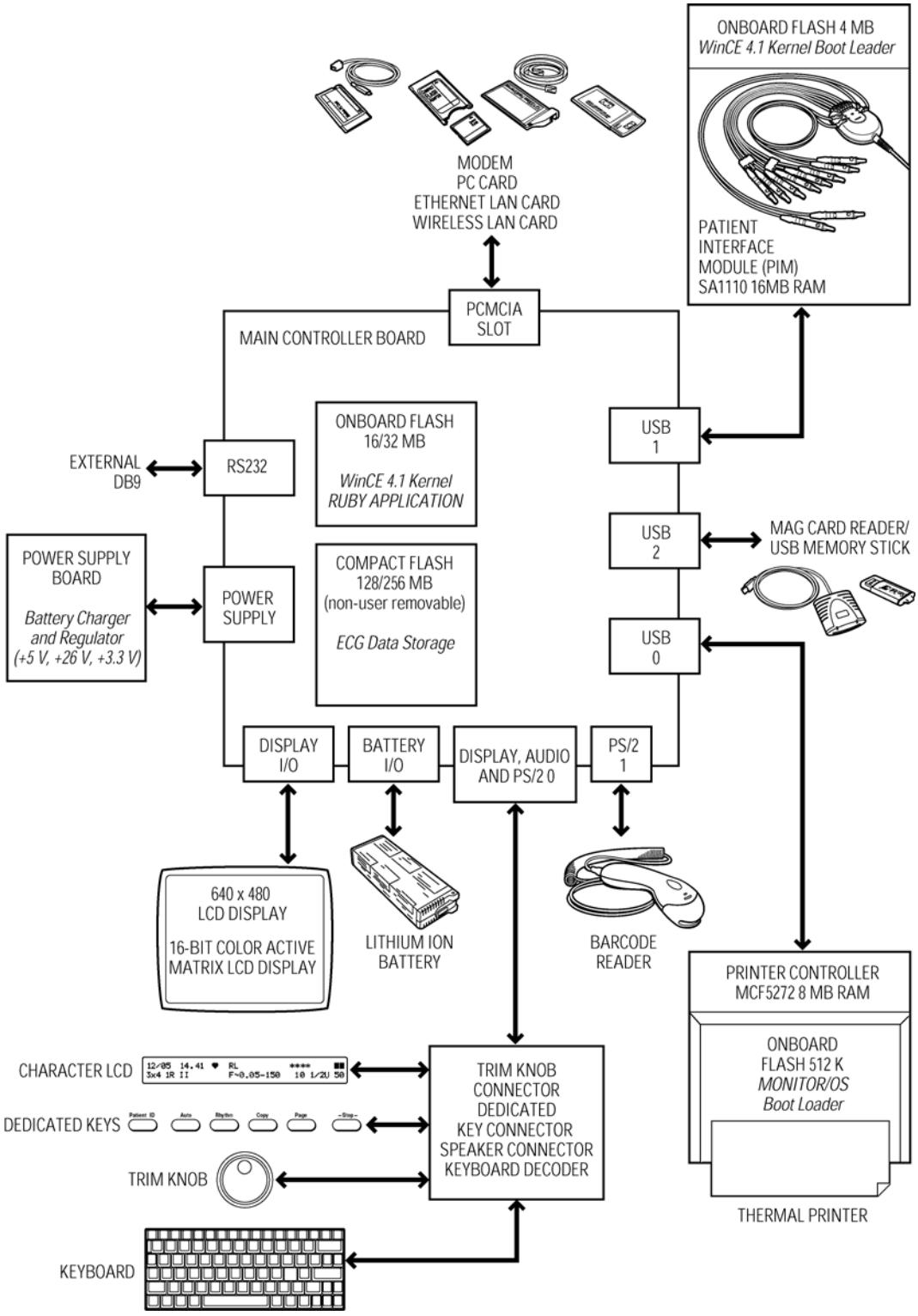
Table 2-1 ECG Storage Capacity

Model	ECG Storage Capacity*
PageWriter Trim II	50
PageWriter Trim III	150
PageWriter Trim Rx	200

*. ECG storage capacity is not dependent upon the size of the internal CF card. The ECG storage capacity is controlled by the cardiograph software application.

Figure 2-1 illustrates the devices and interfaces provided by the main control board.

Figure 2-1 Devices and Interfaces for the Main Control Board



The board presents a backplane through the rear of the PageWriter Trim case. This allows the user to access interfaces shown as *external* in Figure 2-1. Other external interfaces include the PCMCIA slot, USB connector, and the PS/2 connection for a barcode reader device.

Display

The PageWriter Trim II, III and Rx cardiograph display is 640 x 480 pixels, up to 64-color TFT LCD with backlight. All display functions are handled by the main control board using the S1D13506 (EPSON) graphics accelerator chip.

The PageWriter Trim I display is a 40 x 2 line character LCD with cursor. Its function is driven directly by SA1110.

Patient Interface Module (PIM)

The PIM is a SA1110-based WinCE subsystem that is connected by USB to the main control board. It provides real-time data acquisition of ECG signals from electrodes connected to the patient.

Printer Control (USB)

All data printing is handled by the Main Board. The printer control is a Motorola Coldfire processor-based control circuit. It provides ECG waveform rendering and basic bitmap imaging operations, and uses a PCL-like control language API for page description and feed control.

Battery (Lead-Acid)

The battery is a lead-acid 12-volt unit, providing 2.9 Amp-Hours of current when fully charged.

Keyboard/Trim Knob (PS/2)

The PageWriter Trim II, III and Rx cardiographs include a laptop-format, PS/2, sealed, full-key action keyboard. Also included is a Trim Knob that is used as a pointing device for easy navigation, and six dedicated function keys located on the right side of the cardiograph. This assembly also includes a keyboard matrix, Trim Knob decoder, and daughter board. The daughter board provides language-specific keyboard support and decoding via PS/2, with standard WinCE device drivers for key and Trim Knob input into the cardiograph. It is powered by a PS/2 connection.

The PageWriter Trim I cardiograph includes six dedicated function keys and a Trim Knob. The dedicated function keys and the Trim Knob interface to the Main Board through the PS/2 port.

Magnetic Card Reader (PS/2)

A magnetic card reader is available as an option for all product models except the PageWriter Trim I. It connects through an external PS/2 connector and provides ISO and standard encoded magnetic strip support. Manual removal and insertion is required.

NOTE The PS/2 port is not a plug-and-play port. You must attach the magnetic card reader to the port before powering on the cardiograph.

Barcode Reader (PS/2)

A barcode reader is available as an option for all product models except the PageWriter Trim I. It connects through an external PS/2 connector and provides standard barcode scanning capability. It emulates a keyboard, allowing scanned codes to be presented to the PageWriter Trim cardiograph as if they had been typed on the standard keyboard, powered by a PS/2 connection. The barcode reader can be configured using special barcodes.

NOTE The PS/2 port is not a plug-and-play port. You must attach the barcode reader to the port before powering on the cardiograph.

Smart Card Reader

A Smart Card Reader is available as an option for all product models except the PageWriter Trim I. It connects through an external USB connector and provides standard Smart Card reading capability. The PageWriter Trim cardiograph uses the Smart Card Reader to obtain patient information.

USB Memory Stick

A USB memory stick is available as an option for all product models except the PageWriter Trim I. It connects through the USB connector located on the rear panel of the cardiograph. The USB memory stick can be used to store and transfer ECGs and orders between the cardiograph and a TraceMaster or TraceMasterVue ECG Management System.

CAUTION Do not insert a USB memory stick into the cardiograph, or remove a USB memory stick from the cardiograph when the cardiograph is acquiring ECG data from a patient.

CAUTION Only use the USB memory stick to transfer data between the cardiograph and a computer. Do not use the USB memory stick with other devices.

PCMCIA Storage Card

A PCMCIA Storage Card is available as an option for all product models except the PageWriter Trim I. It connects through the PCMCIA slot located on the rear of the cardiograph. The PCMCIA storage card can be used to store and transfer ECGs and orders between the cardiograph and a TraceMaster or TraceMasterVue ECG Management System, or can be used to store custom configured cardiograph settings.

PCMCIA LAN Card

A PCMCIA LAN Card is available as an option for all product models except the PageWriter Trim I. It connects through the PCMCIA slot and provides standard LAN capability. The PageWriter Trim cardiograph communicates with the TraceMaster or TraceMasterVue ECG Management System through the PCMCIA LAN Card.

PCMCIA Wireless LAN Card

A PCMCIA wireless LAN Card is available as an option for the PageWriter Trim III and Rx model cardiographs only. It connects through the PCMCIA slot and provides standard LAN capability and is compatible with the 802.11b wireless standard. The PageWriter Trim cardiograph communicates with the TraceMaster or TraceMasterVue ECG Management System through the wireless PCMCIA LAN Card. For information on configuring the wireless LAN card, see “Wireless LAN Installation Instructions” on page C-1.

PCMCIA Modem Card

A PCMCIA modem card is available as an option for all product models except the PageWriter Trim I. It connects through the PCMCIA slot and provides standard modem capability. The PageWriter Trim cardiograph faxes ECG data to remote receivers or communicates with a TraceMaster or TraceMasterVue ECG Management System through the PCMCIA modem card.

WARNING **Do not connect the modem card to a phone line when the cardiograph is connected to a patient.**

High Level ECG Data Flow and Storage

General ECG data flow begins with acquisition by the Patient Interface Module (PIM) from electrodes placed on a patient. Data is streamed real-time to the main control board, where it is received into the application buffers in RAM. These buffers are used to present the signal data on the real-time screen. When the user initiates an Auto ECG print, the corresponding 10-second segments of the signal data are then copied to the temporary ECG storage memory in RAM.

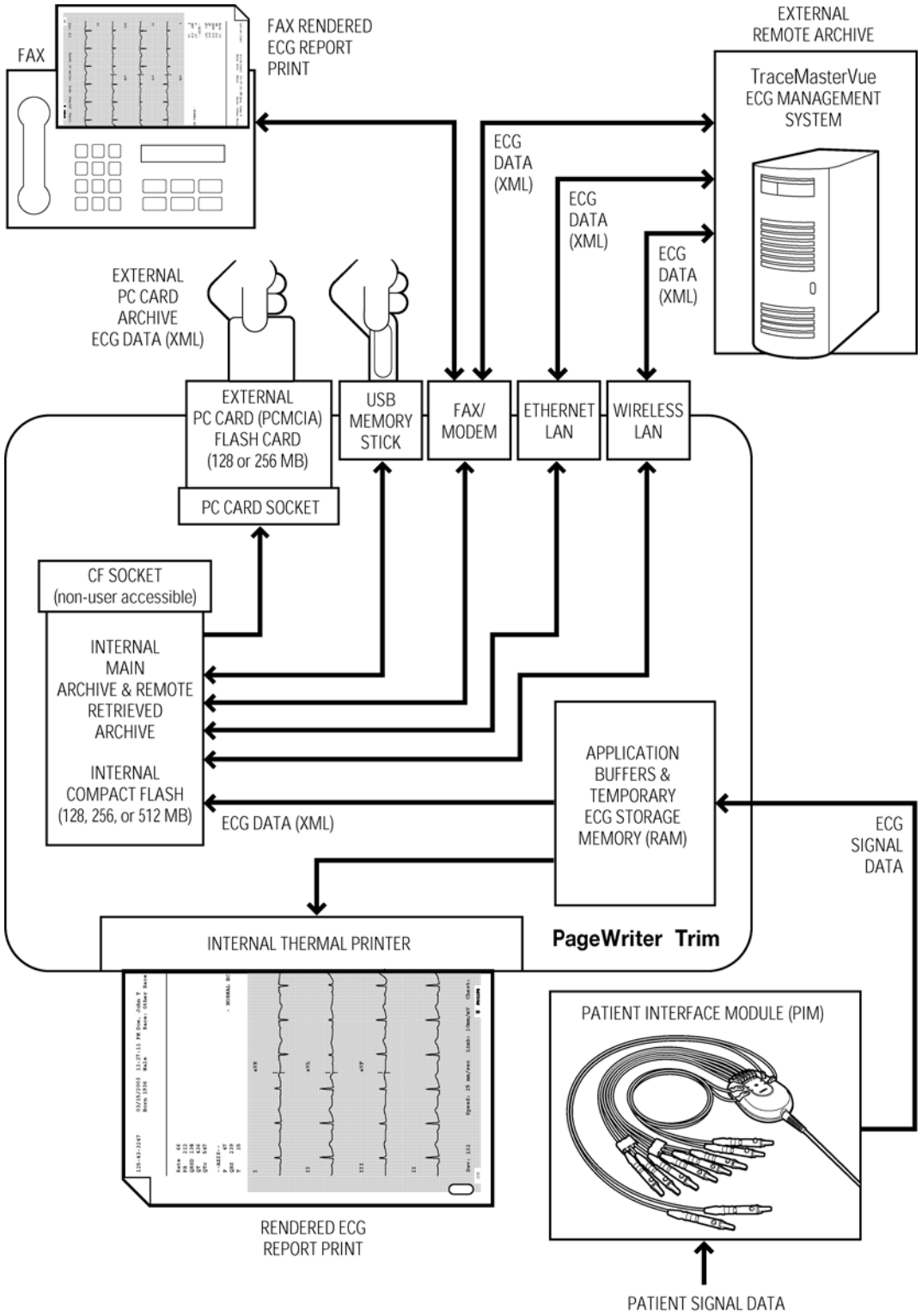
These 10-second segments are named ECG reports that can be previewed and printed. In the case of Auto mode, the ECG report may be configured to automatically print. An ECG report contains signal data, analysis information, patient demographics, and acquisition information, along with operator and device information. See the *XML Utility Suite Instructions for Use* available on the Philips InCenter site (incenter.medical.philips.com) for a complete description of the contents of the ECG data record. For information on using the InCenter site, see page 1-26.

If the **Automatic Save After Print** option is enabled on the cardiograph, the ECG report is saved in XML format to the internal main archive. This archive is non-volatile and resides on the internal CompactFlash (CF) card. Index files with a CDB extension are also maintained in this archive.

From the internal main archive, the ECG XML data format files can be copied, deleted, previewed, printed, and transferred to other devices. The internal main archive cannot receive ECG XML files from external devices. Retrieved ECG file storage is limited to the internal remote archive.

NOTE PageWriter Trim-generated ECG XML files comply with the Philips Medical Systems ECG XML Schema version. They incorporate an embedded CRC32 value, which is used to ensure the data integrity of the file.

Figure 2-2 ECG Flow and Storage


FAX
FAX RENDERED ECG REPORT PRINT
EXTERNAL REMOTE ARCHIVE
TraceMasterVue ECG MANAGEMENT SYSTEM
ECG DATA (XML)
ECG DATA (XML)
ECG DATA (XML)
EXTERNAL PC CARD ARCHIVE ECG DATA (XML)
EXTERNAL PC CARD (PCMCIA) FLASH CARD (128 or 256 MB)
USB MEMORY STICK
FAX/ MODEM
ETHERNET LAN
WIRELESS LAN
PC CARD SOCKET
CF SOCKET (non-user accessible)
INTERNAL MAIN ARCHIVE & REMOTE RETRIEVED ARCHIVE
INTERNAL COMPACT FLASH (128, 256, or 512 MB)
ECG DATA (XML)
APPLICATION BUFFERS & TEMPORARY ECG STORAGE MEMORY (RAM)
ECG SIGNAL DATA
INTERNAL THERMAL PRINTER
PageWriter Trim
PATIENT INTERFACE MODULE (PIM)
RENDERED ECG REPORT PRINT
PATIENT SIGNAL DATA

Internal Main Archive

The internal main archive resides on the internal CompactFlash (CF) card, and is used as the primary ECG data repository. This archive is referred to as the **Main Archive** in the software application. ECG XML files and related index files are stored here in the RubyArchiveInternal directory. All stored ECG files transition through this archive prior to transfer or copying to other devices, such as the PC card.

Currently, the internal main archive is limited to storing the following maximum number of ECGs.

NOTE The PageWriter Trim I cardiograph does not provide internal storage.

Table 2-2 Maximum Number of ECGs Stored (Internal Main Archive)

Model	Maximum Number of ECGs Stored
Trim I	No storage capability - 0
Trim Rx	200
Trim III	150
Trim II	50

Internal Remote Archive

The internal remote archive resides on the internal CompactFlash (CF) card much like the internal main archive. All XML files retrieved from remote sites, such as the TraceMasterVue ECG Management System, reside in this archive until deleted. ECG XML files and related index files are stored in the RubyArchiveRemote directory.

Currently, the internal remote archive is limited to a maximum of 100 ECGs.

NOTE The PageWriter Trim I cardiograph does not provide an internal remote archive.

External PC Card Archives

The external PC card archives reside on a compatible PC card inserted into the PC card slot. Files may then be transferred to inserted cards using the Archive feature of the application software, and are stored in XML format. An index file is created and maintained on each PC card when CDB files are transferred or copied from the card.

NOTE The PageWriter Trim I cardiograph does not offer an external storage option.

Currently, an external PC card archive is limited to storing the following maximum number of ECGs.

Table 2-3 Maximum Number of ECGs Stored (External PC card)

Model	Maximum Number of ECGs Stored
All models but Rx	150

Table 2-3 Maximum Number of ECGs Stored (External PC card) *(continued)*

Model	Maximum Number of ECGs Stored
Trim Rx	200

NOTE When you add or delete compatible ECG XML files from a PC card (not using the PageWriter Trim), it is recommended that you delete all CDB files prior to reinserting the PC card into the cardiograph. In the absence of an index file, the cardiograph automatically regenerates the index based on the XML files on the PC card.

External USB Flash Memory Stick Archives

The external USB flash memory stick archives reside on a compatible memory stick connected to the USB port. Files can then be transferred to a connected memory stick using the **Archive** feature of the application software, and are stored in XML format. An index file is created and maintained on each compatible memory stick when CDB files are transferred or copied from the stick. Currently, an external memory stick archive is limited to storing the following maximum number of ECGs as listed in Table 2-4.

NOTE The PageWriter Trim cardiograph only supports the USB memory stick that is shipped with the cardiograph, or that is available for purchase as an optional accessory from Philips Medical Systems. Philips does not guarantee that other USB memory sticks are compatible with the PageWriter Trim cardiograph.

Table 2-4 Maximum Number of ECGs Stored (External USB Flash Memory Stick)

Model	Maximum Number of ECGs Stored
All models except Rx	150
Trim Rx	200

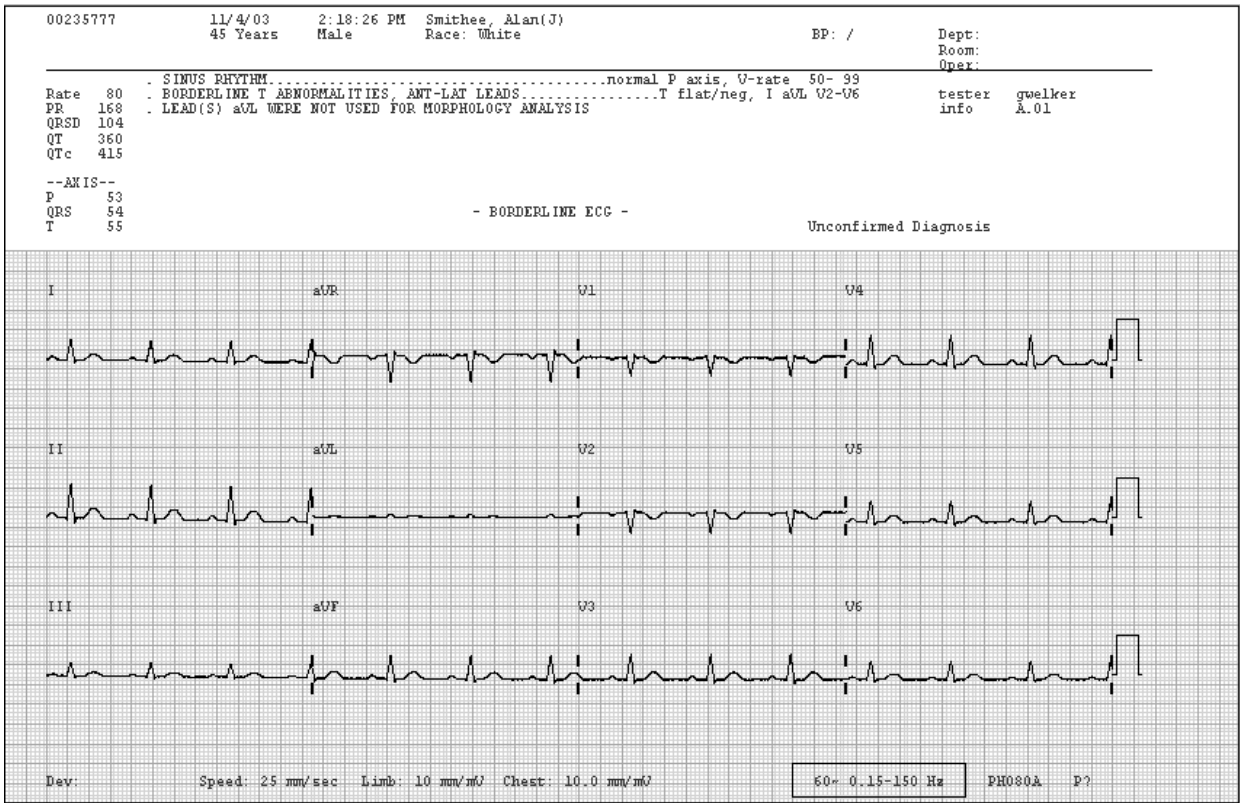
NOTE When you add or delete compatible ECG XML files from a memory stick (not using the cardiograph), it is recommended that you delete all CDB files prior to reconnecting the memory stick to the cardiograph. In the absence of an index file, the cardiograph automatically regenerates the index based on the XML files on the memory stick.

Rendered ECG Report Prints

A rendered ECG report print is a hard copy representation of the ECG data. This includes a high-resolution print of the signal data, and may include configured patient demographics, acquisition information, and other non-signal data elements.

The PageWriter Trim allows the user to customize the fields on an ECG report print. The report print may consist of one or more continuous pages on perforated thermal media from the printer.

Figure 2-3 Rendered ECG Report Print Sample



Fax-Rendered ECG Report Print

A fax-rendered ECG report print is equivalent to the rendered ECG report print, as described in the previous section, except it has been adjusted to comply with fax transmission and resolution device requirements. When the user starts a fax transfer, the ECG report is rendered and transmitted to a remote receiving fax machine that has been pre-configured on the cardiograph, using the optional fax and modem PC card. The fax-rendered ECG report print may be stored on the received system end as an electronic file, and not actually used to produce a printed copy.

NOTE No guarantee is made as to the suitability of the faxed 12-lead ECG for any particular purpose, due to the variability inherent in fax technology.

WARNING **Do not connect the modem card to a phone line when the cardiograph is connected to a patient.**

Power System Overview

The PageWriter Trim cardiograph power system consists of:

- A 65-watt AC/DC medical grade power module
- One 12 volt, 2.9 amp-hour lead-acid rechargeable battery
- A power supply board which includes battery charging circuitry, various voltage regulators, and logic circuitry to provide for battery operation

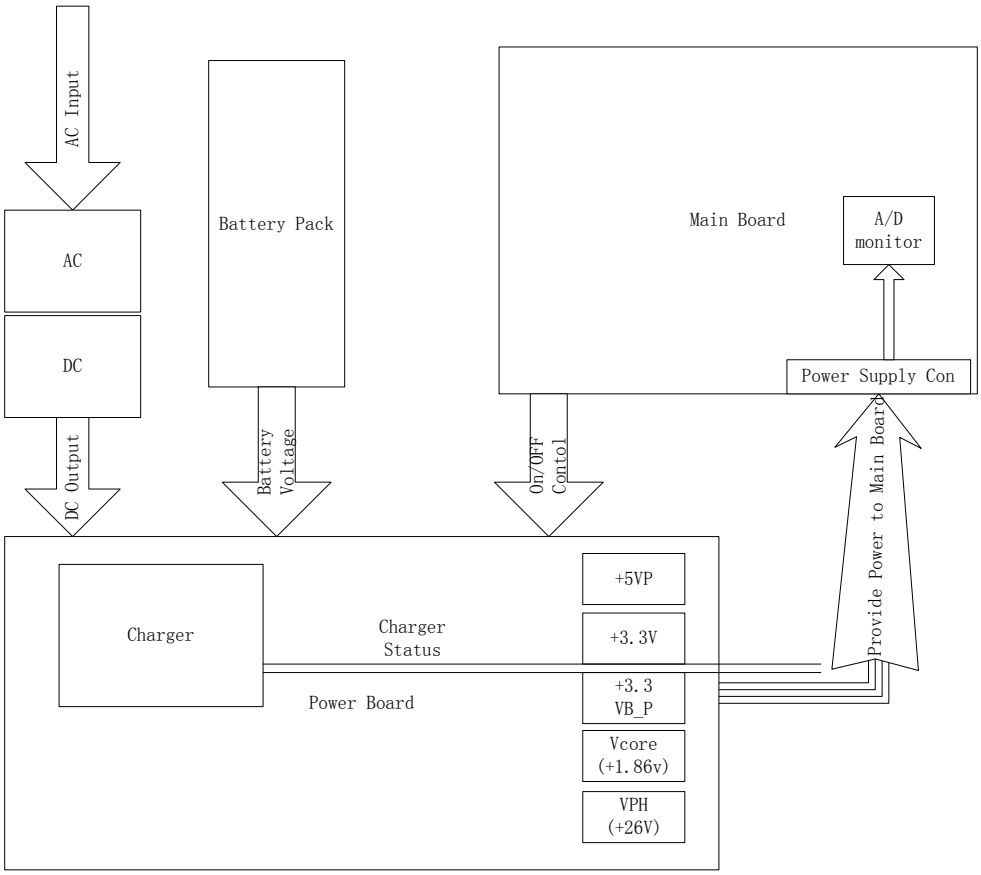
The PageWriter Trim cardiograph is designed to run primarily on battery power, using AC power for the purpose of recharging the battery. The power board contains a battery charging chip that controls battery charging. The main board has an A/D converter that monitors the voltage of the power supply, and a Board Status Register (BSR) that monitors the battery charging status.

The major power draws within the PageWriter Trim cardiograph are the LCD display backlights, which can draw up to 4 watts, and the thermal printer, which can draw approximately 48 watts. Provisions have been incorporated into the PageWriter Trim cardiograph that allow the user to adjust the display brightness. To extend battery life, set the display brightness to the low or medium setting. Also, activate the power save mode (dims the screen) to further extend battery life. The printer control board is current-limited for normal printing. However, if print demand is too high, the current limiter will not print the output, resulting in a faded page. For more information on configuring power saving options on the cardiograph, see Chapter 2 “Configuration” of the *PageWriter Trim Cardiograph Instructions for Use*, available for download from the Philips InCenter site (incenter.medical.philips.com).

Battery

The 12V recharged sealed lead-acid battery provides power to the PageWriter Trim cardiograph. The battery provides a high-current discharge as needed for thermal printing. Built-in protection circuitry in each pack prevents damage to the battery by overcharging, over discharging, over current, and over temperature.

Figure 2-4 Power System Block Diagram



Power Labels

The following represent the various power labels used on the PageWriter Trim cardiograph.

Vin

The DC voltage direct from the AC power. The voltage level is between 17.10V and 18.90V, with a maximum power output of 65 watts. This voltage is monitored.

VB+_T (Battery information)

The battery voltage range is between 10.0V and 14.8V. Discharge current is limited to a continuous 2.9 amps, with a 4.0 amp limit for short periods. This voltage is monitored.

VO

The voltage will be supplied by Vin and battery. Its range is between 10.0V to 18.90V. The voltage is monitored.

+3.3V

Output from the U113 (power board) regulator. This switching regulator will supply 3.3V at up to 4.25A of current. This voltage is monitored.

+3.3VB_P

Output from U111 (power board) regulator, an MIC5233, for the real timer and power sequence circuit. The voltage level is 3.3V, and can provide up to 100mA of current. This voltage is not monitored.

VDDX

Output from +3.3V through a π filter, which is the primary power for the main system processors and memory. The voltage level is 3.3V. This voltage is monitored.

Vcore (+1.86V)

Output from the U105 (power board) circuit, an LTC1627, which is 1.86V core power for the main system processor. The input to this regulator is from the 3.3V supply, and can supply up to 500mA of current. This voltage is monitored.

+5VP

Output from the U101(power board) circuit, an LTC1374, which supplies all the 5.00V power to the system. Input is from V0, and output is 5.00V with a maximum current of 4A. This voltage is monitored.

USB_VCC

Output from the U303 (main board) circuit, an MIC2503, which supplies the barcode reader and other external USB device. Input is from +5V, and output is +5V with maximum current of 500mA. This voltage is monitored.

VPH

Output from the U108 (power board) circuit, an LM2588, which supplies +26V power to the printhead. It is controlled by printer MCU, MCF5272, which is located on main board. VPH provides power only when a print session starts. Otherwise, VPH does not provide power. This voltage is monitored by MCF5272.

Power Management

Battery Charging Logic

The system host processor controls several functions of the power system. These include:

- Activating sleep mode if no activity is detected for a preset period of time.
- Restricting the user from printing when the charge capacity reaches preset levels.
- Alerting the user when maintenance is needed for the battery.

Battery Gauge

The battery gauge on the PageWriter Trim II, III and Rx cardiographs consists of four segments. When the battery is fully charged, all four segments are displayed.

The battery gauge on the PageWriter Trim I LCD display consists of two icons. It appears in the upper right corner of the LCD.

NOTE The battery gauge may not always accurately reflect the true charge state of the battery due to the age of the battery, or due to failure to perform specified battery maintenance.

Table 2-5 and Table 2-6 describe the different battery level indicators for all models of the PageWriter Trim cardiograph.

Table 2-5 PageWriter Trim I Battery Status Indicator

Battery Level	Status Indicator
Fully Charged Battery	
50% power capacity	
Low Battery Power	
Low Battery Alert	
No or Dead Battery	
Battery is charging	

Table 2-6 Trim II/III/Rx Battery Status Readings

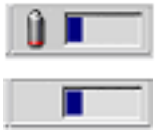
Battery Level	Status Indicator
Fully Charged Battery	
75% power capacity	
50% power capacity	
Low Battery Power	
Low Battery Alert (alternate icons flashing)	
No or Dead Battery	

Table 2-6 Trim II/III/Rx Battery Status Readings *(continued)*

Battery Level	Status Indicator
Battery is charging (moving bars)	

Battery Discharging

When the battery is discharged to the 30% level, the PageWriter Trim cardiograph disables high-demand printing, and continues to allow the battery to be discharged to a 20% level. When the 20% level is reached, the PageWriter Trim cardiograph disables printing, and warns the user to plug in the AC power cord. If the AC power cord is not plugged in within three minutes, the PageWriter Trim cardiograph automatically shuts down.

NOTE The battery will continue to discharge when the cardiograph is not in use, or if the battery is stored outside of the cardiograph.

Battery Charging

When the AC power cord is plugged in, the battery begins to charge. Check the charging status on the Board Status Register (BSR).

Charge Current

When the cardiograph is in active operating mode, the charge current is 580mA. When the cardiograph is in Standby (power save) mode, the charge current depends on the battery. The initial charge is approximately 580mA in bulk charger status. When the voltage is up to approximately 14.6V, the current is slowly reduced to approximately 100mA over time as it enters floating charging.

Battery Information

Battery information is sent from the battery charger, UC3909. This information is then sent up to the host processor via BSR, and can be viewed from the Biomed Service Utility screen. For more information, see “About the Trim II/III/Rx Biomed Service Utility” on page 4-6.

3

Cardiograph Care and Maintenance

This chapter contains information on basic cardiograph care and periodic maintenance. If further technical assistance is required, contact the nearest Philips Response Center. For more information, see “Contacting a Philips Response Center” on page 1-32. The PageWriter Trim cardiograph does not require scheduled preventive maintenance.

Cleaning the Cardiograph

To clean the cardiograph:

1. Unplug the AC power cord.
2. Wipe the external surfaces of the cardiograph with a soft cloth dampened in any of the approved cleaning solutions listed below.

CAUTION When cleaning, avoid the lead wire connectors and patient data cable connectors.

Approved Cleaning Solutions

- Mild soap and water
- Isopropyl alcohol

CAUTION **Do not** use strong solvents or abrasive cleaning materials.

Do not spill liquids on the surface of the cardiograph.

Do not use any of the following to clean the cardiograph:

- Acetone
- Iodine-based cleaners
- Phenol-based cleaners
- Ethylene oxide sterilization
- Chlorine bleach
- Ammonia-based cleaners

The cardiograph or PIM should not be autoclaved, ultrasonically cleaned, or immersed.

Cleaning the PIM, Patient Data Cable, and Lead Wires

CAUTION **Do not:**

- Use isopropyl alcohol
- Autoclave the patient data cable or lead wires or use ultrasonic cleaners
- Immerse
- Use abrasive materials
- Wet the connectors

To clean the PIM, patient data cable, and lead wires:

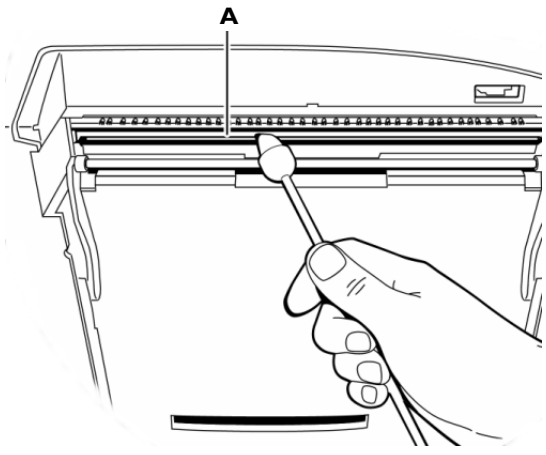
1. Dampen a soft cloth with soapy water or with one of the disinfectants or cleaning agents listed below. Clean patient data cable and lead wires with any of the following:
   - Cidex Ortho Phthaladehyde
   - Cetylcide
   - Vesphene 2 Aqueous Phenolic Germicidal Agent
2. Wring excess moisture from the cloth before cleaning.

Cleaning the Print Head

A dirty print head may cause poor or uneven print quality.

TIP Clean the print head more frequently when printing large volumes of ECGs.

Figure 3-1 Paper Drawer and Print Head



A Print head

To clean the print head:

1. Pull the paper drawer completely out from the front of the cardiograph.
2. Turn the unit over.
3. Wipe the print head lightly with a foam swab dipped in 90% alcohol.
4. Allow the print head to dry.

Reusable Electrode Cleaning

To clean reusable electrodes:

1. Dampen a soft cloth with one of the disinfectants or cleaning agents listed below.

- Cidex Ortho Phthaladehyde
- Cetylcide
- Vesphene 2 Aqueous Phenolic Germicidal Agent

CAUTION **Do not:**

- Use isopropyl alcohol
- Autoclave the reusable electrodes or use ultrasonic cleaners
- Use abrasive materials

2. Wring excess moisture from the cloth before cleaning.

Replacing Printer Paper

Replace the printer paper when a red stripe appears on the printed ECG report. Only use Philips Medical Systems replacement printer paper. For part number and ordering information, see page 1-20.

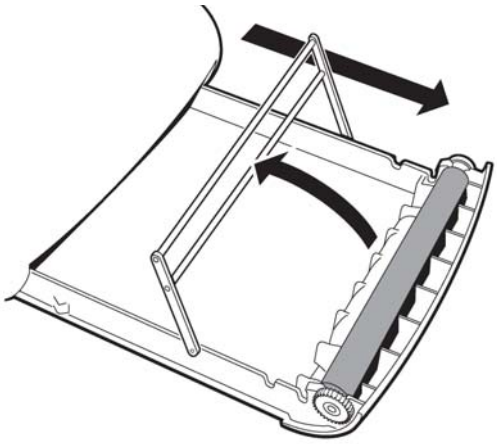
- Always load less than 100 sheets of printer paper into the paper tray
- Ensure that the entire first page of the new paper roll is fully draped over the roller before closing the printer door

PageWriter Trim II, III and Rx:

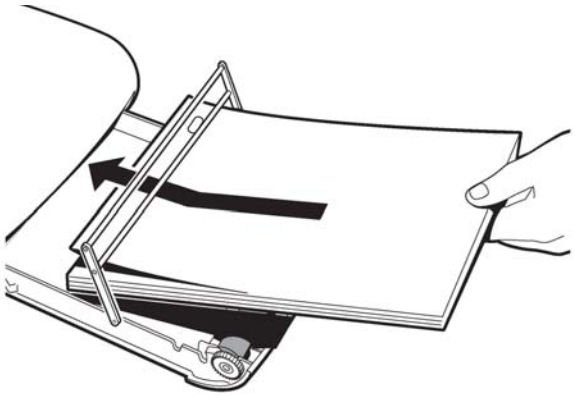
- Ensure that the paper size configured for the cardiograph is the same size paper being loaded into the paper drawer

To change the printer paper:

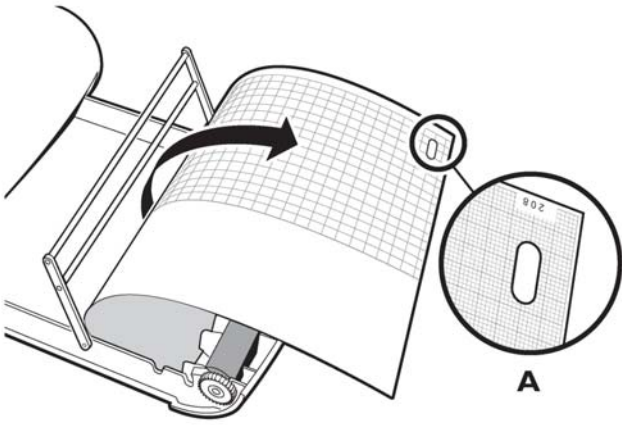
1. Open the paper drawer on the front of the cardiograph and remove any remaining sheets.
2. Lift up the paper bar.



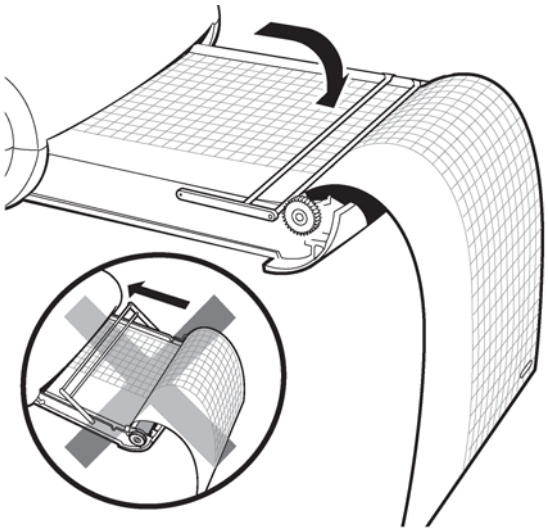
3 Insert a new pack of printer paper with the printed side facing up. Ensure that no more than 100 sheets are being inserted into the paper tray.



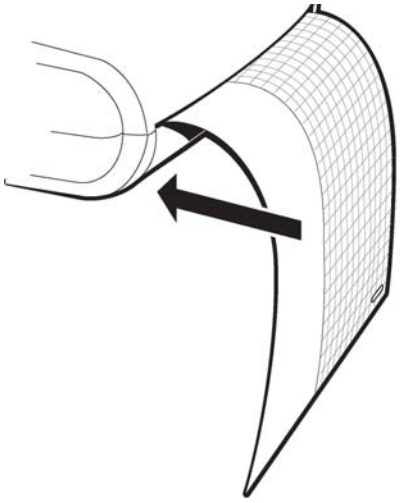
4 Ensure that the paper sensor hole (**A**) is positioned as shown.



5 Drape the entire first sheet over the roller. Lower the paper bar. Ensure that the perforated edge of the paper aligns with the edge of the paper drawer, and that the paper bar is pulled down completely. Do not close the paper drawer with the paper bar in an upright position.

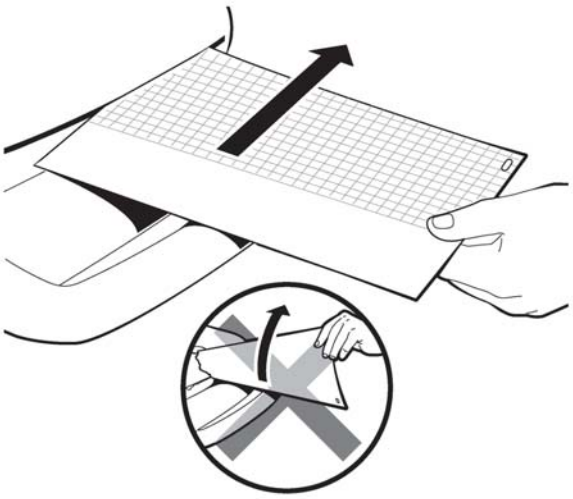


6 Close the paper drawer.



7 Press the **Page** button on the right side of the cardiograph to advance the paper to the beginning of a sheet.

8 Tear off the first sheet as shown.



Battery Maintenance and Care

Caring for the Battery

The battery must be installed for proper operation of the cardiograph. The cardiograph cannot print an ECG report without the battery, even if it is plugged into AC power.

The sealed lead-acid battery used in the PageWriter Trim cardiographs will provide optimal longevity when the batteries are fully charged after each use. A depleted battery requires sixteen hours of continuous charge time to fully recharge. Because it is not always possible to allow a full charge cycle between uses, the cardiograph was designed to charge a depleted battery to 90% of its capacity in approximately eight hours.

CAUTION Repeated undercharging of the battery will damage the battery and reduce overall battery life.

NOTE Philips recommends that the cardiograph be plugged into AC power whenever possible to maximize battery life.

Battery life varies depending on frequency of use and maintenance, and environmental conditions when the battery is used or stored. For improved battery life, keep the cardiograph plugged in when not in use. If the battery has been fully charged and requires recharging after a few ECGs, consider replacing it.

For optimal battery performance:

- Only use Philips Medical Systems lead-acid battery (Philips part number 989803130151) with the cardiograph.
- Keep the cardiograph plugged into AC power at all times when not in use.

- If the battery has been fully charged and requires recharging after a few ECGs, consider replacing it.
- The use of cardiograph accessories (barcode reader, magnetic card reader, PC card, modem) will deplete battery power at a faster rate. The battery will require more frequent charging if these accessories are used with the cardiograph.

NOTE The battery should be removed and placed in storage if the cardiograph will not be used for more than thirty days.

Storing the Battery

Remove the battery from the cardiograph if it will be stored for more than thirty days without use. While in storage, the battery will require a full recharge every six months. Charge the battery for at least sixteen hours to ensure that the battery does not completely discharge while in storage. Battery life will be prolonged when stored in cooler temperatures, but will be damaged if stored below freezing (0 °C/32° F). Store the battery at a temperature of 40 °C (104° F) or lower. The recommended ideal battery storage temperature is 25 °C (77° F).

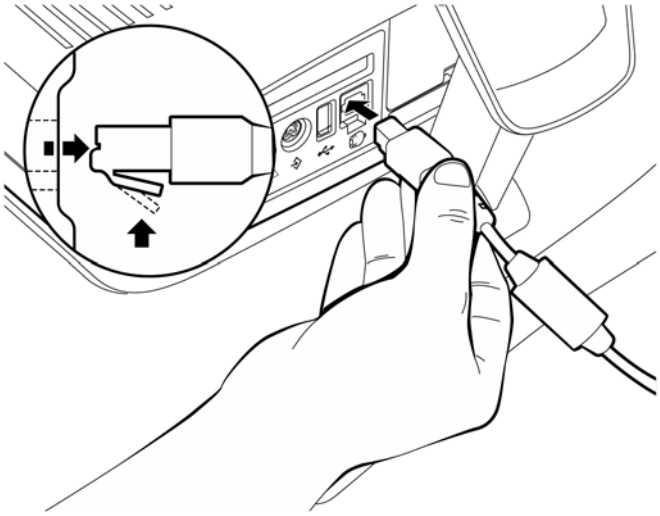
To store the battery:

1. Charge the battery for sixteen hours before removing it from the cardiograph. Ensure that the AC power cord is connected to the cardiograph and is plugged into a grounded AC power outlet. Check that the green AC power indicator light on the front of the cardiograph is lit.
2. After charging is complete, remove the battery from the cardiograph and store it in a cool, dry location. For information about removing or replacing the battery, see Chapter 7, “Removing and Replacing Cardiograph Components.”
3. Recharge the battery for sixteen hours every six months while battery is in storage.

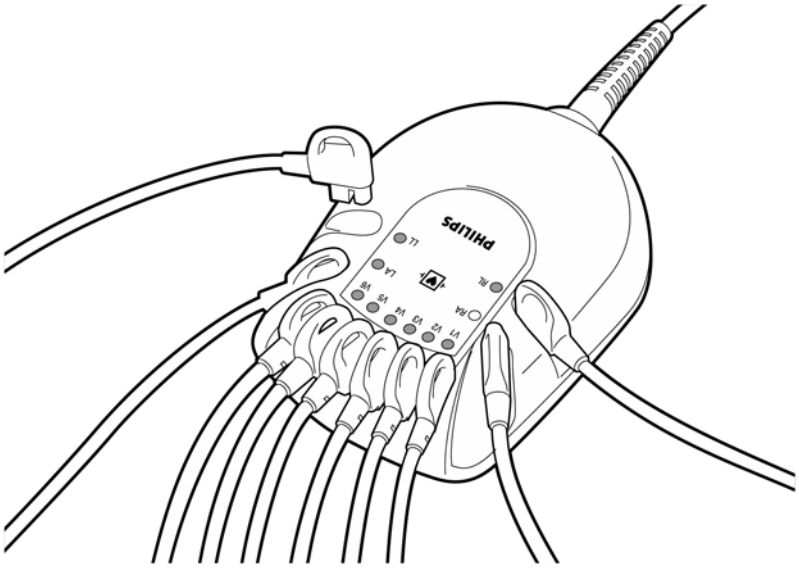
Replacing the Lead Wires in the PIM

To replace the lead wires:

1 Disconnect the PIM from the RJ-11 receptacle (rear of cardiograph).

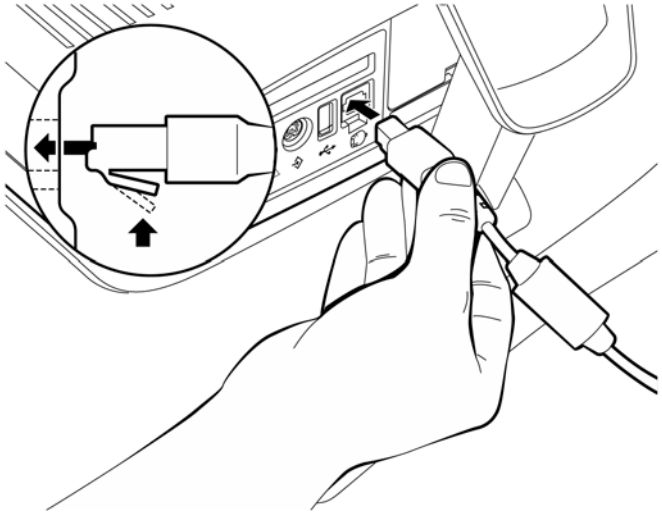


2 Remove the lead wire(s) by pulling the connector up.



3 Match the lead wire labeling (on lead) with the same lead wire connector on the PIM. Replace the lead wire by snapping it into the connector.

4 Reattach the patient data cable to the RJ-11 receptacle (rear of cardiograph).



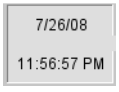
WARNING **To ensure safety and prevent damage to the system, only connect the patient data cable to the correct PIM connector on the rear of the cardiograph.**

Cardiograph and Accessory Disposal

When the cardiograph has reached the end of its product life, dispose of it according to local ordinances. When any of the cardiograph accessories reach the end of their product life, dispose of these items in accordance with manufacturer instructions and local ordinances.

Setting the Date and Time

PageWriter Trim II, III and Rx



To change the date and time:

1 Press the *Tab* key ( ) or turn the Trim Knob to highlight the displayed date and time on the Command Toolbar.

2 Press the space bar or the Trim Knob to select it. The Date and Time Settings window appears.

3 The month drop-down list is highlighted. Press the space bar or the Trim Knob to display the drop-down list.

4 Press the up ( ) or down ( ) arrow key or turn the Trim Knob to highlight the current month. Press the space bar or the Trim Knob to select it.

5 Repeat the procedure to select the current year, date, and time.

6 When done, press the *Enter* key ( ) to save the new date and time settings. The new date and time appears on the Command Toolbar.

PageWriter Trim I

To change the date and time:

1 Turn the Trim Knob until the date on the LCD display is highlighted.

2 Push the Trim Knob. A screen appears showing the current date and time settings.

3 Turn the Trim Knob until the field to be changed is highlighted.

4 Push the Trim Knob to select the field.

5 Turn the Trim Knob to scroll through the options for that field.

6 Push the Trim Knob to select a setting.

7 Repeat the procedure to set the current **Month**, **Day**, **Year**, **Hour**, **Minute**, and **Second**.

8 When all settings are complete, turn the Trim Knob to highlight the arrow icon (←).

9 Push the Trim Knob to save the settings and to exit the screen.

Setting the Paper Size and Lead Settings

To set the paper size and lead settings:

1 Select the **Config** button.

2 Press *Alt+S* to select the **System** tab.

3 Set the **Paper Size** (A/A4**)** and **Lead Name** (AAMI/IEC**)** settings. For more information on localization option settings for paper size and lead standards, see Table B-7, “Software Localization Options,” on page B-8.

The optional barcode reader is shipped with configured settings that provide optimal use with the cardiograph. If the barcode reader operates with errors or missed data, follow the procedure “Calibrating the Barcode Reader” on page 3-11.

If the barcode reader incorrectly scans data into fields on the Patient ID screen, follow the procedure “Removing the Carriage Return” on page 3-13.

Calibrating the Barcode Reader

The optional barcode reader is shipped with configured settings that provide optimal use with the cardiograph. If the barcode reader operates with errors or missed data, follow the procedure below.

If the barcode reader incorrectly scans data into fields on the Patient ID screen, follow the procedure “Removing the Carriage Return” on page 3-13.

The barcodes must be scanned in order from top to bottom in one session.

To calibrate the barcode reader:

1. Hold the barcode reader at a 45^{o} angle and push the button (top of scanner). Scan the barcode labeled 1 in Figure 3-2. Three *beeps* are heard.
2. Scan the barcodes labeled 2-8 in Figure 3-2. A single *beep* is heard after each barcode is scanned.
3. After barcode 8 is scanned three *beeps* are heard. Calibration is complete.

   Perform the Barcode Test (see page 4-2) to verify performance.

Figure 3-2 Barcode Calibration Sequence

1

2

3

4

5

Configuration Code #3

*8162700

6

Configuration Code #4

*816680

7

Configuration Code #5

*8188100

8

Exit program mode

*999999

Removing the Carriage Return

Scan the following barcode when the barcode reader incorrectly scans data in any field on the Patient ID screen. The following procedure removes a carriage return from the end of a data scan that can cause errors when entering Patient ID information.

To calibrate the barcode reader:

1 Hold the barcode reader at a 45° angle and push the button (top of scanner). Scan the barcode in Figure 3-3. Three *beeps* are heard.

Figure 3-3 Barcode scan to remove the automatic carriage return

2 Perform the Barcode Test (see page 4-2) to verify performance.

Maintenance Tests for Trim II, III and Rx

Use the diagnostic utilities and maintenance tests to verify or to optimize cardiograph performance. The following tests can be executed during active normal cardiograph use, and may be helpful in identifying a technical problem.

For information on maintenance tests that are available through the Biomed Service Utility, see “About the Trim II/III/Rx Biomed Service Utility” on page 4-6. Using the Biomed Service Utility requires a full restart of the cardiograph.

For further assistance with any of the maintenance tests described in this section, contact the nearest Philips Response Center. See "Contacting a Philips Response Center" on page 1-32.

To open the Diagnostics/Maintenance Test screen:

1 Press the *Tab* key ( ) or turn the Trim Knob to highlight the **Config** button on the Command Toolbar.

2 Press the space bar or the Trim Knob to select the button. The Configuration screen appears.

3 Select the **System** tab by holding down the *Alt* key (on keyboard) and then pressing the **S** key. The **Diagnostics** section of the screen lists the five maintenance tests.

Appendix 4, “Maintenance Tests” provides instructions for each test. Refer to the page numbers in the table below to locate a specific test.

Table 3-33 Diagnostic and Maintenace Tests available in Configuration

Test	Page
PIM Test	4-2
Barcode Test	4-2
Magcard Test	4-3
Printer Test	4-3
Network Test	4-6

4

Maintenance Tests

This appendix provides instructions for performing maintenance tests on the PageWriter Trim II/III/Rx cardiograph from the normal cardiograph operating mode, and includes instructions for using the Biomed Service Utility. Using the Biomed Service Utility requires a full restart of the cardiograph. This appendix also includes instructions on using the PageWriter Trim I cardiograph Biomed Service Utility.

The tests contained in this appendix help you to identify specific technical issues with the cardiograph.

Maintenance Tests (Trim II/III/Rx only)

You can use the maintenance tests and diagnostic utilities in the normal cardiograph operating mode to verify or to optimize cardiograph performance. These tests can be used as the first step in identifying a technical problem with the cardiograph.

To open the Maintenance Test screen:

1 Press the *Tab* key ( ) or turn the Trim Knob to highlight the **Config** button on the Command Toolbar.

NOTE Access to Configuration may be password controlled.

2 Press the space bar or the Trim Knob to select the button. The Configuration screen appears.

3 Select **System(S)** by holding down the *Alt* key on the keyboard, then pressing the *S* key. The System screen appears.

The **Diagnostics** section of the screen lists the five configuration/maintenance tests.

Table 4-34 Maintenance Tests

Test	Page
PIM Test	4-2
Barcode Test	4-2
Magcard Test	4-3
Printer Test	4-3
Network Test	4-6

Patient Interface Module (PIM) Test

This test is used to confirm that the Patient Interface Module (PIM) is communicating with the cardiograph. This test can be performed when the cardiograph displays PIM error messages, or when the cardiograph is unable to acquire data from the PIM. Be sure that the PIM patient data cable is securely attached to the PIM connector on the rear of the cardiograph before performing the test.

If this test fails, it may indicate a problem with the PIM or with the PIM patient data cable.

To perform the PIM Test:

1. Press the *Tab* key ( ) or turn the Trim Knob to highlight the **PIM Test** button under **Diagnostics**.
2. Press the space bar or the Trim Knob to select the button. The message **Accessing PIM...** appears. The **PIM Test Result** window appears and indicates that the PIM Test has passed, or that the cardiograph is unable to communicate with the PIM.
3. If the message **PIM Test Passed** appears, the PIM is communicating properly with the cardiograph. The **OK** button is highlighted. Push the Trim Knob to close the window.
4. If the message **Please Check the Patient Interface Module** appears, check that the PIM patient data cable is securely attached to the PIM connector on the rear of the cardiograph. If the error message persists, contact Philips Medical Systems for assistance, see “Contacting a Philips Response Center” on page 1-32.

Barcode Reader Test

NOTE You must attach the barcode reader to the port on the rear of the cardiograph before powering on the cardiograph.

The Barcode Reader Test is used with the optional barcode reader. This test can be used to confirm that the barcode reader is accurately scanning barcode data. Ensure that the barcode reader is securely attached to the barcode reader port on the rear of the cardiograph before performing the test.

To perform the barcode reader test:

1. Press the *Tab* key ( ) or turn the Trim Knob to highlight the **Barcode Test** button under **Diagnostics**.
2. Press the space bar or the Trim Knob to select the button. The Barcode Reader test window appears.
3. Hold the barcode reader at a 45^{o} angle and scan a test barcode.
4. The barcode data appears next to the **Patient ID** field. Review the barcode data to ensure that it is accurate. The **OK** button is highlighted. If the barcode data is accurate, press the space bar or the Trim Knob to select the **OK** button. Turn the Trim Knob to highlight the **Cancel** button if the barcode data is incorrect.
5. If the test fails, perform a barcode reader calibration and try the test again. See "Calibrating the Barcode Reader" on page 3-11.

Magnetic Card Reader Test

NOTE You must attach the magnetic card reader to the port on the rear of the cardiograph before powering on the unit.

The Magnetic Card Reader Test is used with the optional magnetic card reader. This test can be used to confirm that the magnetic card reader is correctly reading data from a magnetic card. Ensure that the magnetic card reader is securely attached to the magnetic card reader connector on the rear of the cardiograph before performing the test.

To perform the magnetic reader test:

1. Press the *Tab* key ( ) or turn the Trim Knob to highlight the **Magcard Test** button.
2. Press the space bar or the Trim Knob to select the button. The Magnetic Card Reader window appears.
3. Insert the magnetic card into the slot.
4. Leave the magnetic card in the slot for five seconds and then pull it out.
5. The magnetic card data appears next to the **Patient ID** field.
6. Review the data to ensure that it is correct. The **OK** button is highlighted. If the magnetic card data is accurate, push the Trim Knob to select the **OK** button. Turn the Trim Knob to highlight the **Cancel** button if the magnetic card data is incorrect and push to select it.
7. If the test fails, try it again.

Printer Test

The Printer Test is used to verify that the cardiograph printer is able to correctly print the test page. Use this test to verify proper printer performance or when reports appear to have print quality errors.

To perform the print test:

1. Press the *Tab* key ( ) or turn the Trim Knob to highlight the **Printer Test** button under **Diagnostics**.
2. Press the space bar or the Trim Knob to select the button. The message **Printing Test Page...** appears and the test page prints out.
3. Review the printer test page at points A, B, C, and D as shown on Figure 4-4, “Printer Test Page” on page 4-5.

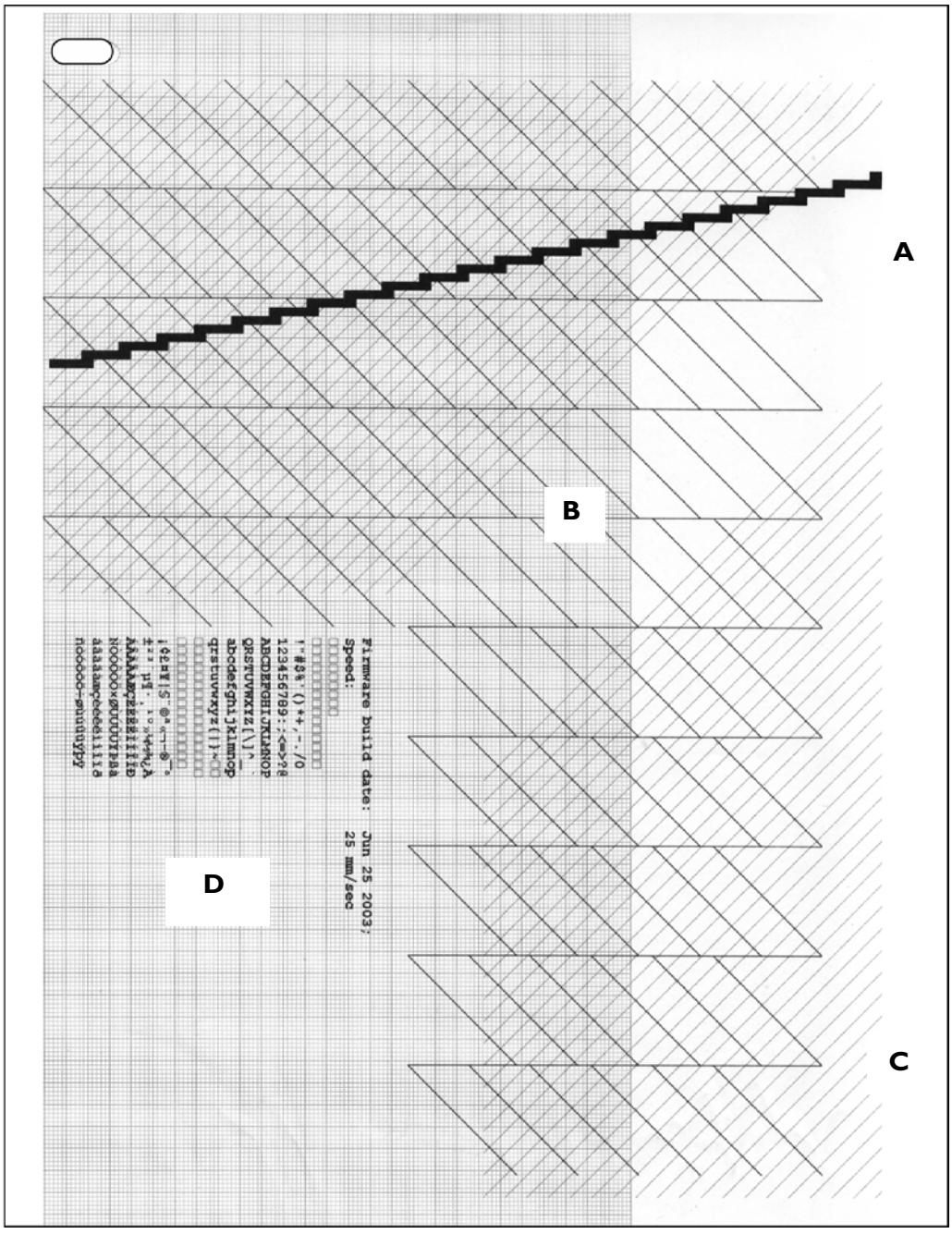
Table 4-35 Printer Test Page Description

Test Point	Description
A	The stepped bars are sharp edged and printed cleanly without distortion or missing segments
B	The spacing between the vertical lines is 25 mm with a discrepancy of no more or less than 2%

Table 4-35 Printer Test Page Description *(continued)*

Test Point	Description
C	The diagonal lines should be straight and printed cleanly without distortion or breaks in the lines
D	The character set is printed cleanly without distortion or missing characters, and all characters are clearly legible

Figure 4-4 Printer Test Page



4 If the printer test page matches the printer test points as described in Table 4-35, “Printer Test Page Description,” on page 4-3, the cardiograph has passed the printer test. If the printer test page does not match the printer test points, the cardiograph has failed the print test.

Network Test

The Network Test displays the configured network information for the cardiograph. All cardiograph network configuration is completed on the Network screen. From any Configuration screen, press and hold down the *Alt* key on the keyboard, and then press the *N* key to select the **Network** tab and to open the Network screen. Before performing the Network test, ensure that the LAN card is fully inserted into the PC Card slot on the rear of the cardiograph, and that the LAN cable is fully inserted into the cable connector on the card.

CAUTION Only use the shielded LAN cable provided with the PageWriter Trim cardiograph (Philips part number 989803138021). Do not use LAN cables with the cardiograph that have not been approved by Philips Medical Systems.

To perform the network test:

1. Press the *Tab* key ( ) or turn the Trim Knob to highlight the **Network** button.
2. Press the space bar or the Trim Knob to select the button. The Network Connection window appears. The configured network information for the cardiograph appears on the window.
3. Review the network data to ensure that it is correct. The **Retry** button is highlighted. If the network data does not display, press the Trim Knob again.
4. If the network data displays correctly, turn the Trim Knob to highlight the **Close** button. Push the Trim Knob to select the button.

Trim II/III/Rx Diagnostic and Performance Verification Tests

More comprehensive diagnostic tests and operating statistics are provided in the Biomed Service Utility. These tests and utilities are used to identify and to troubleshoot a technical problem with the cardiograph.

CAUTION Ensure that the AC power cord is plugged into the rear of the cardiograph and into a grounded electrical outlet before using the Biomed Service Utility. If the cardiograph is powered by battery power only while using the Biomed Service Utility, the battery will fail and will not recover.

About the Trim II/III/Rx Biomed Service Utility

The Biomed Service Utility screen displays important information and statistics about the cardiograph and is a valuable diagnostic tool when troubleshooting the cardiograph.

Using the Biomed Service Utility, you can:

- Check important unit status
- Check the current software revisions

- Install new software
- Check the amount of ECG storage remaining
- Confirm DC voltages
- Examine battery statistics
- Run diagnostic tests
- Extract system log files for analysis by Philips personnel
- Print a cardiograph status report

Using the Biomed Service Utility for Trim II, III, Rx

CAUTION Ensure that the AC power cord is plugged into the rear of the cardiograph and into a grounded electrical outlet before using the Biomed Service Utility. If the cardiograph is powered by battery power only while using the Biomed Service Utility, the battery will fail and will not recover.

Launching the Biomed Service Utility for Trim II, III, Rx

To launch the Biomed Service Utility:

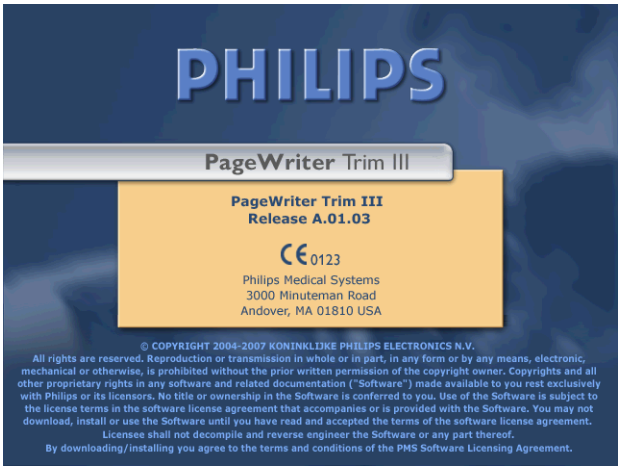
1 Place the cardiograph in Off mode.

NOTE Entering the Biomed Service Utility will require a full restart of cardiograph. Any unsaved patient data will be lost.

2 Press the On/Standby button to power on the unit.

After approximately 20 seconds, the PageWriter Trim software identification screen appears, followed by an audible *beep*.

Figure 4-5 Software identification screen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Release A.01.03
CE 0123
Philips Medical Systems
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By downloading/installing you agree to the terms and conditions of the PMS Software Licensing Agreement.

3 Quickly, while the software identification screen is displayed, hold down the left *CTRL* and *SHIFT* keys together and press the Trim Knob.

NOTE The software identification screen disappears after five seconds. If you miss it, you must restart the cardiograph again.

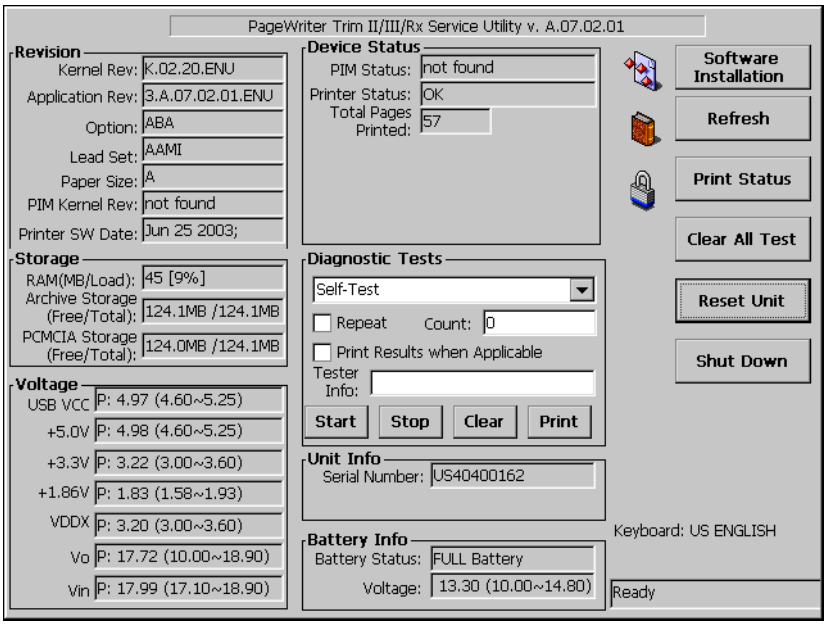
An Access Code window appears. If the Access Code window does not appear, try the left *CTRL-SHIFT-TrimKnob* sequence again.

4 Type the access code.

The factory default code is **1573**.

The Biomed Service Utility screen appears as shown in Figure 4-6.

Figure 4-6 Biomed Service Utility Screen for II, III, and Rx



Diagnostic Tests in the Biomed Service Utility

NOTE For ease of navigation, connect a USB mouse to the rear of the cardiograph when using the Biomed Service Utility.

The following tests are available on the Diagnostic Tests menu. Select the desired test using the Up and Down arrows on the keyboard, or using a mouse. Select the **Start** button to start the test.

Table 4-36 Diagnostic Tests in Biomed Service Utility

Test	Page
Audio Test	4-10
Smart Card Reader	4-10
Magnetic Card Reader	4-11
Barcode Reader	4-11
Compact Flash	4-12

Table 4-36 Diagnostic Tests in Biomed Service Utility *(continued)*

Test	Page
Fax/Modem	4-12
Keyboard	4-12
Onboard Flash	4-13
PC Card (PCMCIA Storage)	4-14
Printer	4-14
Network Ping	4-14
Screen	4-14
Serial Loopback (not supported)	--
Suspend Button	4-16
Trim Knob	4-16
Self-Tests	4-22

Working with the Diagnostic Tests

The following options are available when working with diagnostic tests.

- *Repeat/Count/Print Results when Applicable*

  To repeat a particular test or all Self-Tests sequentially, select the **Repeat** check box and type the desired number of repetitions in the **Count** field.

  The count number decrements by one each time the test is completed (pass or fail). To print test results, check the **Print Results when Applicable** box.

  To interrupt or stop testing, press **Stop** between tests.

- *Tester Info*

  Enter tester name and date.

- *Start*

  Starts the selected test.

- *Stop*

  Stops or interrupts the selected test

- *Print*

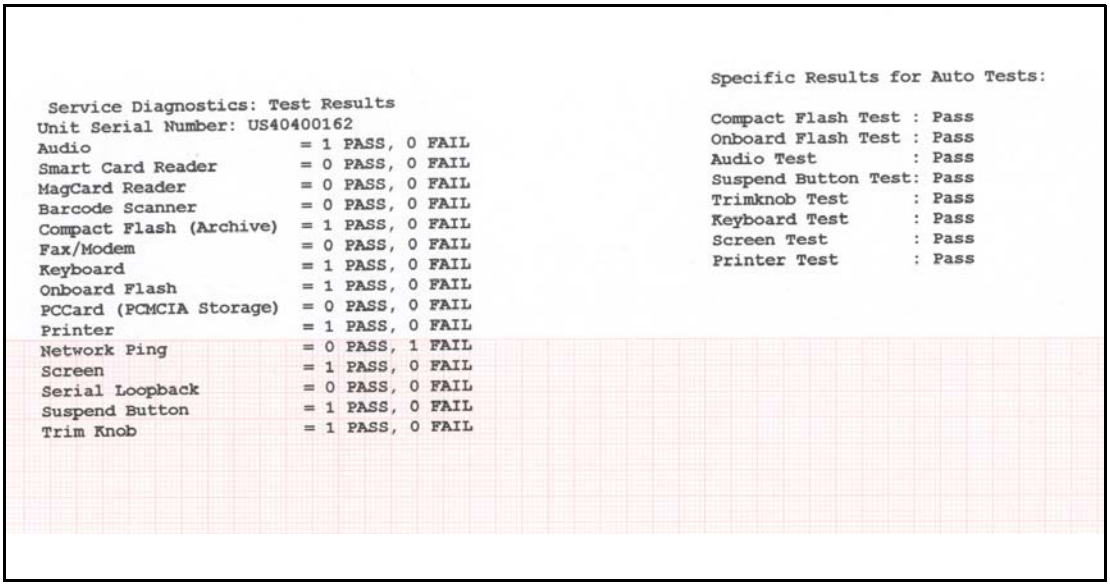
  The results of all the diagnostic tests you have run are stored. To print them, select **Print**. See Figure 4-7, “Trim II/III/Rx Service Diagnostics: Test Results,” on page 4-10.

  The test results are stored until you either exit the Biomed Service Utility or select **Clear Results**.

- *Clear Results*

  Clears the Test Results.

Figure 4-7 Trim II/III/Rx Service Diagnostics: Test Results


Service Diagnostics: Test Results
Unit Serial Number: US40400162
Audio = 1 PASS, 0 FAIL
Smart Card Reader = 0 PASS, 0 FAIL
MagCard Reader = 0 PASS, 0 FAIL
Barcode Scanner = 0 PASS, 0 FAIL
Compact Flash (Archive) = 1 PASS, 0 FAIL
Fax/Modem = 0 PASS, 0 FAIL
Keyboard = 1 PASS, 0 FAIL
Onboard Flash = 1 PASS, 0 FAIL
PCCard (PCMCIA Storage) = 0 PASS, 0 FAIL
Printer = 1 PASS, 0 FAIL
Network Ping = 0 PASS, 1 FAIL
Screen = 1 PASS, 0 FAIL
Serial Loopback = 0 PASS, 0 FAIL
Suspend Button = 1 PASS, 0 FAIL
Trim Knob = 1 PASS, 0 FAIL
Specific Results for Auto Tests:
Compact Flash Test : Pass
Onboard Flash Test : Pass
Audio Test : Pass
Suspend Button Test: Pass
Trimknob Test : Pass
Keyboard Test : Pass
Screen Test : Pass
Printer Test : Pass

Audio Test

Tests whether the cardiograph is emitting sounds.

To test audio:

1. From within the Biomed Service Utility, select **Audio** from the list, and select **Start**.

   The test emits an audible beeping tone.

2. Select **Stop** to stop the tone.

3. Select **Yes** when the see the message **Did you hear the audio beeps?**

   The result is printed on the Test Results report.

Smart Card Reader Test

Verifies that the Smart Card reader is working properly. The optional Smart Card reader option must be connected to the cardiograph before performing the test.

To test the Smart Card reader:

1. From within the Biomed Service Utility, select **Smart Card Reader** from the list, and select **Start**.

2. Insert the Smart Card into the slot with the magnetic stripe facing down, then remove it. The Smart Card data appears.

3. Review the data to ensure that it is correct.

4. Select **OK** if the data is displayed correctly.

   Select **Fail** if the data is not displayed correctly.

5 If the Smart Card reader fails the test, try the test again. The result is printed on the Test Results report.

Magnetic Card Reader Test

NOTE You must attach the magnetic card reader to the port on the rear of the cardiograph before powering on the cardiograph.

Verifies that the magnetic card reader is working properly. The optional magnetic card reader must be connected to the cardiograph before performing the test.

To test the magnetic card reader:

1 From within the Biomed Service Utility, select **MagCard Reader** from the list, and select **Start**.

2 Insert the magnetic card into the slot on the front of the cardiograph with the magnetic stripe facing down, then remove it.

The magnetic card data appears next to **Magcard Track 1**.

3 Review the data to ensure that it is correct.

4 Select **Done**.

5 The message **Did the Read field show the correct information?** appears.

Select **Yes** if the data is displayed correctly. Select **No** if the data is not displayed correctly.

6 If the magnetic card reader fails the test, try the test again. The result is printed on the Test Results report.

Barcode Reader Test

NOTE You must attach the barcode reader to the port on the rear of the cardiograph before powering on the cardiograph.

In order to properly perform the Barcode Reader Test, the optional barcode reader must be connected to the cardiograph before performing the test.

To test the barcode reader:

1 From within Service Mode, select **Barcode Reader** from the list, and select **Start**.

The Barcode Test window appears.

2 Hold the barcode reader at a 45^{o} angle and scan the barcode. The barcode data appears next to **Bar Code Field**.

3 Review the barcode data to ensure that it is correct.

4 Select **Done**.

5 The message **Did the Read field show the correct information?** appears.

Select **Yes** if the data is displayed correctly.

Select **No** if the data is not displayed correctly.

6 If the barcode reader fails the test, perform a barcode reader calibration and try the test again. See "Calibrating the Barcode Reader" on page 3-11.

Compact Flash (Archive) Test

Verifies that the Compact Flash is working properly.

To test the Compact Flash:

1 From within the Biomed Service Utility, select **Compact Flash (Archive)** from the list, and select **Start**.

2 A message lets you know if the Compact Flash passed the test. Select **OK.** If the compact flash card fails the test, try the test again.The result is printed on the Test Results report.

Fax/Modem Test

This test verifies that a fax/modem card is present in the PC card slot and that it responds correctly to AT commands.

To test the Fax/Modem:

1 Insert an approved Modem card in the slot in the back of the cardiograph.

2 From the Biomed Service Utility, select **Fax/Modem Test** from the list, then select **Start**.

The Modem Test performs the following checks to verify if the modem is compatible with the cardiograph:

- Modem recognition
- ROM and Firmware verification

The test is not successful if the modem is not properly recognized, or if the ROM or firmware verification fails.

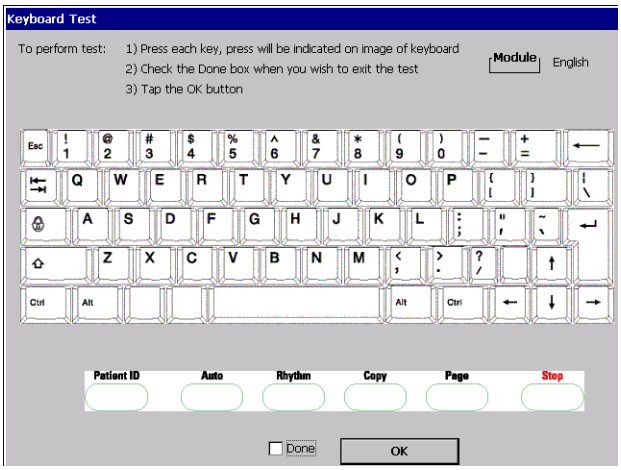
Keyboard Test

A successful Keyboard test is one in which each key is properly recognized when pressed.

1 From the Biomed Service Utility, select **Keyboard** from the list, then select **Start**.

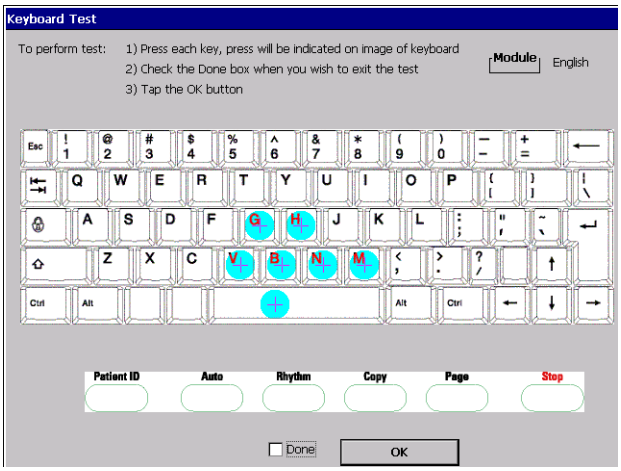
The Keyboard Test window appears.

Figure 4-8 Keyboard Test window



2 Press each key on the keyboard. If a key is highlighted, the key is registered.

Figure 4-9 Keyboard Test window with highlighted keys



3 After all the keys are highlighted, the **Done** check box is automatically selected. Press the *Enter* key (on keyboard) to finish the test.The test is not successful if any keys are not recognized when you press them.

Onboard Flash Test

Verifies that the Onboard Flash is working properly.

To test the Onboard Flash:

1 From within the Biomed Service Utility, select **Onboard Flash (Archive)** from the list, and select **Start**.

2 A message lets you know if the Onboard Flash passed the test. Select **OK.**

If the onboard flash card fails the test, try the test again.

The result is printed on the Test Results report.

PC Card (PCMCIA Storage) Test

Reports the external PC card or PCMCIA card size in bytes (if installed), and whether any error was reported when the media was polled.

To perform the PC Card Test:

1. Insert a blank PCMCIA card with PCMCIA adapter in the PCMCIA slot located in the back of the cardiograph.
2. From the Biomed Service Utility, select **PC Card Test** from the list, then select **Start**.

   The cardiograph will detect and report the media size of the card. If the test fails, the message **PC Card Test failed** appears.

Printer Test

To perform the Printer Test:

1. From the Biomed Service Utility, select **Printer Test** from the list.

   The Printer Test window appears with the message **Printing Test Page...** The printer test page prints.
2. Complete steps 3 and 4 of “Printer Test” on page 4-3.

Network Ping Test

Determines whether a particular device/system is accessible over the network.

To perform the Network Ping:

1. From within the Biomed Service Utility, select **Network Ping** from the list, and select **Start**.
2. Enter the IP Address to Ping. A message reports if the ping was successful.

Screen Test

The Screen Test is used to verify the quality of the color displayed on the LCD screen.

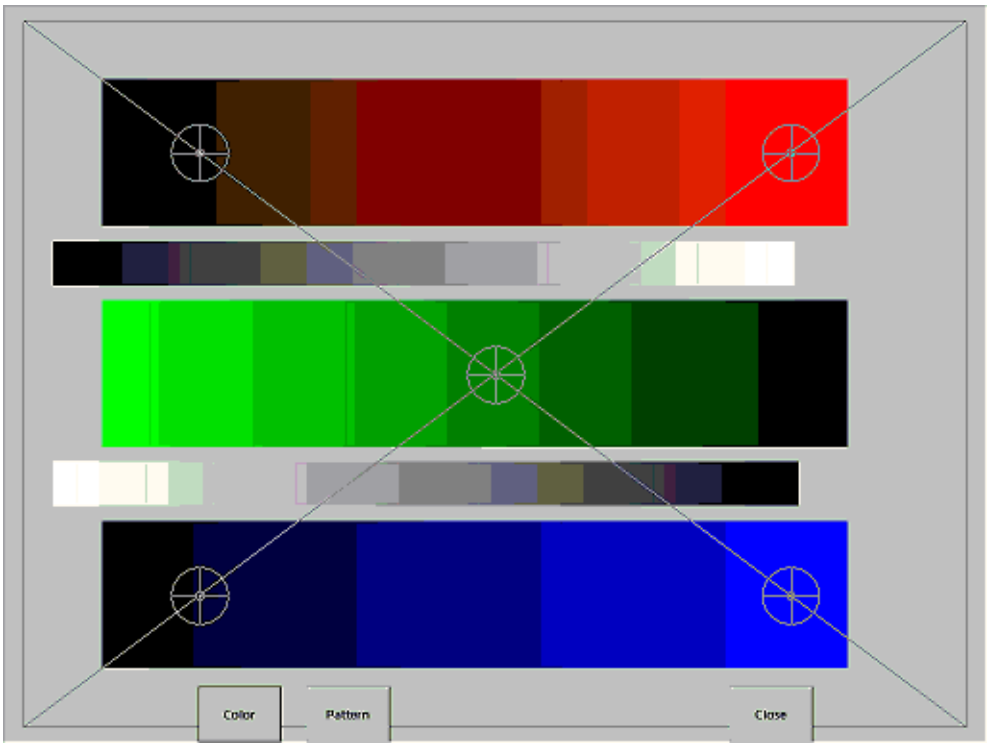
To perform the Screen Test:

1. From the Biomed Service Utility, select **Screen Test** from the list, then select **Start**.

   A blank gray screen appears.
2. Select **Color** at the lower left of the screen.
3. Select **Pattern** on the bottom of the screen. An image similar to that shown in Figure 4-10, “Screen Test Image,” on page 4-15 should appear.

NOTE The color gradations in the image on the cardiograph display will be more gradual and smoother than those shown in Figure 4-10.

Figure 4-10 Screen Test Image



4 Look for the following details in the image appearing on the screen:

- The progression of shading (from light to dark) in the red, green, and blue bars should be smooth and without breaks.
- The gray lines (on top of color bars) should be straight and intersect the cross hairs at five points on the screen.

If the screen does not look similar to the image in Figure , the screen display failed the Screen Test.

5 After examining the image, Select **Close**.

The Test Result Confirmation dialog appears.

6 Select **Yes** if the image on the screen is displayed correctly.

Select **No** if the image on the screen did not display correctly.

A message appears confirming that the Screen Test failed or passed.

7 Select **OK**.

If the cardiograph failed the Screen Test, try it again.

Serial Loopback Test

Not available in this release.

Suspend Button Test

With this test, you can test the **Standby** button functionality independently of the software application.

To test the Suspend Button:

1. From within the Biomed Service Utility, select **Suspend Button** from the list, and select **Start**.
2. Press the On/Standby button.

   A message appears to confirm that the Suspend Button passed the test.

Trim Knob Test

The Trim Knob Test is used to verify that the Trim Knob is working properly.

To test the Trim Knob:

1. From within the Biomed Service Utility, select **Trim Knob** from the list, and select **Start**.
2. Move the Trim Knob to match the display.
3. Select **Pass** if the Trim Knob moves correctly.

   Select **Fail** if the Trim Knob does not move correctly.

Self-Tests

Self-Test performs several individual functional tests. Refer to the following table for details for an individual test.

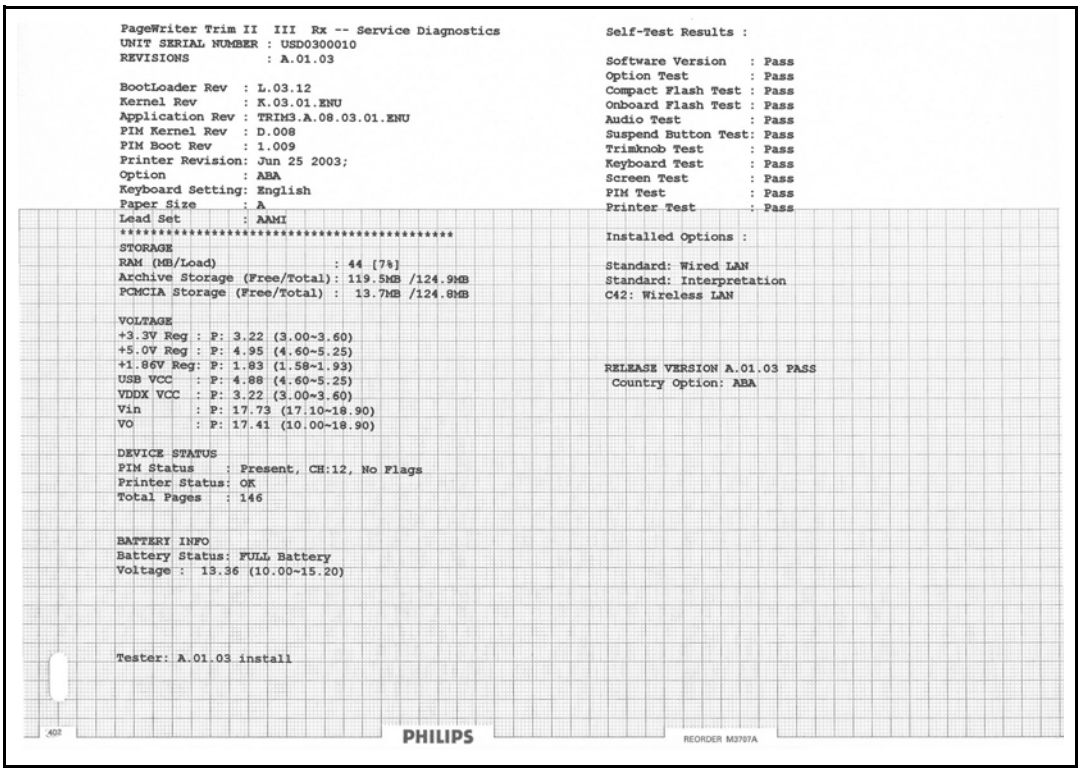
NOTE Be sure the correct paper size is selected before performing the self-tests. See Chapter 2 "Configuration" of the *PageWriter Trim Cardiograph Instructions for Use*.

Table 4-37 Service Mode Self-Tests

Service Mode Self-Tests	Page
Compact Flash Test	4-12
Onboard Flash Test	4-13
Audio Test	4-10
Suspend (On/Standby) Button Test	4-16
Trim Knob Test	4-16
Keyboard Test	4-12
Screen Test	4-14
Printer Test	4-21
Test Results Report	4-17

When the self-tests are completed, a status report is printed automatically. Figure 4-11 on page 4-17 shows a sample report.

Figure 4-11 Self-Test Report


PageWriter Trim II III Rx -- Service Diagnostics
UNIT SERIAL NUMBER : USD0300010
REVISIONS : A.01.03
BootLoader Rev : L.03.12
Kernel Rev : K.03.01.ENU
Application Rev : TRIM3.A.08.03.01.ENU
PIM Kernel Rev : D.008
PIM Boot Rev : 1.009
Printer Revision: Jun 25 2003;
Option : ABA
Keyboard Setting: English
Paper Size : A
Lead Set : AAMI
STORAGE
RAM (MB/Load) : 44 [7%]
Archive Storage (Free/Total): 119.5MB /124.9MB
PCMCIA Storage (Free/Total) : 13.7MB /124.8MB
VOLTAGE
+3.3V Reg : P: 3.22 (3.00~3.60)
+5.0V Reg : P: 4.95 (4.60~5.25)
+1.86V Reg: P: 1.83 (1.58~1.93)
USB VCC : P: 4.88 (4.60~5.25)
VDDX VCC : P: 3.22 (3.00~3.60)
Vin : P: 17.73 (17.10~18.90)
VO : P: 17.41 (10.00~18.90)
DEVICE STATUS
PIM Status : Present, CH:12, No Flags
Printer Status: OK
Total Pages : 146
BATTERY INFO
Battery Status: FULL Battery
Voltage : 13.36 (10.00~15.20)
Tester: A.01.03 install
Self-Test Results :
Software Version : Pass
Option Test : Pass
Compact Flash Test : Pass
Onboard Flash Test : Pass
Audio Test : Pass
Suspend Button Test: Pass
Trimknob Test : Pass
Keyboard Test : Pass
Screen Test : Pass
PIM Test : Pass
Printer Test : Pass
Installed Options :
Standard: Wired LAN
Standard: Interpretation
C42: Wireless LAN
RELEASE VERSION A.01.03 PASS
Country Option: ABA
PHILIPS
REORDER M3707A

Trim I Diagnostic and Performance Verification Tests

Diagnostic tests are included in the Biomed Service Program and are used to identify and to troubleshoot a technical problem with the PageWriter Trim I cardiograph.

CAUTION Ensure that the AC power cord is plugged into the rear of the cardiograph and into a grounded electrical outlet before using the Biomed Service Program. If the cardiograph is powered by battery power only while using the Biomed Service Program, the battery will fail and will not recover.

Launching the Trim I Biomed Service Program

To launch the Biomed Service Program:

1 Turn off the cardiograph.

NOTE Entering the Service Utility requires a full restart of the cardiograph. Any unsaved patient data will be lost.

2 Press the On/Off button to power on the unit. After approximately 20 seconds, the PageWriter Trim I screen appears, followed by a screen showing five triangles.

3 Quickly, while the screen showing five triangles is displayed, press the **Patient ID** and **Auto** buttons at the same time.

NOTE The screen showing five triangles disappears after five seconds. If you miss it, you must restart the cardiograph again.

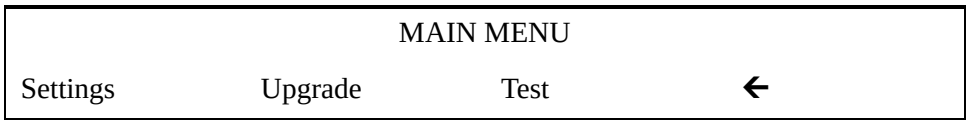
An Access Code window appears. If the Access Code window does not appear, restart the cardiograph. Follow steps 1 to 3 again.

4 Enter the access code by pressing the following buttons in sequence: **Patient ID**, **Auto**, **Rhythm**, **Copy**, **Page**.

NOTE Press the **Stop** button to delete your last input if it is wrong.

The Biomed Service Program Main Menu appears as shown in Figure 4-12.

Figure 4-12 Service Utility Main Menu (Trim I)



Diagnostic Tests in the Trim I Biomed Service Program

The following tests may be completed in one session, or may be individually selected and executed. The **Self-Test** option will conduct all of the tests listed in the following table, with an option to print out the test results.

Table 4-38 Biomed Service Program Diagnostic Tests

Test	Page
Battery	4-19
Keyboard	4-19
LCD Screen	4-19
Onboard Flash	4-20
Options	4-20
PIM	4-20
Printer	4-21
RAM	4-21
Self-Test	4-23
Version	4-22
Voltage	4-23

Battery Test

This test analyzes if the battery voltage is below or above the voltage limits.

To perform the keyboard test:

1. From the Biomed Service Program, turn the Trim Knob to highlight **Test** and push to select it.
2. Turn the Trim Knob to highlight **Test Battery** and push to select it.
3. Turn the Trim Knob to highlight **Start** and push to select it. The test results display on the screen.
4. Press **Patient ID** to print out a report of the test results, or **Stop** to return to the main menu.

Keyboard Test

In a successful keyboard test, each key is properly recognized when pressed.

To perform the keyboard test:

1. From the Biomed Service Program, turn the Trim Knob to highlight **Test** and push to select it.
2. Turn the Trim Knob to highlight **Test Keyboard** and push to select it.
3. Turn the Trim Knob to highlight **Start** and push to select it.

   The Keyboard Test window appears.
4. Press each key on the keyboard. Push the Trim Knob, then turn it clockwise twice, and counterclockwise once to complete the test.

   A numeral appears to represent each key.
5. After the numbers 0-8 all are displayed, the test is successful. Press **Patient ID** to pass the test or **Stop** to fail the test.

   The test is not successful if any keys are not recognized when you press them.

LCD Screen Test

The LCD Screen Test is used to verify that the display is working correctly.

To perform the Screen Test:

1. From the Biomed Service Program, turn the Trim Knob to highlight **Test** and push to select it.
2. Turn the Trim Knob to highlight **Test LCD** and push to select it.
3. Turn the Trim Knob to highlight **Start** and push to select it.
4. Characters scroll past on the screen. Verify that they appear correctly on the screen. Press **Patient ID** to pass the test and **Stop** to fail.

5 If you pressed **Patient ID** to pass the test, now press **Patient ID** to print a report or **Stop** to return to the previous screen.

If the screen test fails, try it again.

Onboard Flash Test

Verifies that the Onboard Flash is working properly.

To test the Onboard Flash:

1 From the Biomed Service Program, turn the Trim Knob to highlight **Test** and push to select it.

2 Turn the Trim Knob to highlight **Test Flash** and push to select it.

3 Turn the Trim Knob to highlight **Start** and push to select it.

4 The test results display on the screen. Press **Patient ID** to print a report or **Stop** to return to the previous screen.

If the onboard flash card fails the test, try the test again.

Options Test

This test verifies that the localization options including the Kernel and Application language, the paper size (A or A4) and the lead standard (AAMI or IEC) are consistent and are properly configured.

To perform the Options test:

1 From the Biomed Service Program, turn the Trim Knob to highlight **Test** and push to select it.

2 Turn the Trim Knob to highlight **Test Options** and push to select it.

3 Turn the Trim Knob to highlight **Start** and push to select it.

4 The test results display on the screen. Press **Patient ID** to print a report or **Stop** to return to the previous screen.

PIM Test

Use this test to confirm that the Patient Interface Module (PIM) is communicating with the cardiograph. This test can be performed when the cardiograph displays PIM error messages, or when the cardiograph is unable to acquire data from the PIM. Be sure that the PIM patient data cable is securely attached to the PIM connector on the rear of the cardiograph before performing the test.

If this test fails, it may indicate a problem with the PIM or with the PIM patient data cable.

To perform the PIM Test:

1 From the Biomed Service Program, turn the Trim Knob to highlight **Test** and push to select it.

2 Turn the Trim Knob to highlight **Test PIM** and push to select it.

3 Turn the Trim Knob to highlight **Start** and push to select it.

4 The test results display on the screen. Press **Patient ID** to print a report or **Stop** to return to the previous screen. If the PIM test fails, try it again. If the failure persists, contact the nearest Philips Response Center for further assistance, see “Contacting a Philips Response Center” on page 1-32.

Printer Test

To perform the Printer Test:

1 From the Biomed Service Program, turn the Trim Knob to highlight **Test** and push to select it.

2 Turn the Trim Knob to highlight **Test Printer** and push to select it.

3 Turn the Trim Knob to highlight **Start** and push to select it.

The Printer Test window appears with the message **Testing Printer...**

4 The cardiograph prints out the printer test page.

Inspect the printer test page using the test points explained in “Printer Test” on page 4-3. If the printer test page matches the printer test points as described in Figure 4-35, “Printer Test Page Description,” the cardiograph has passed the printer test.

If the printer test page does not match the printer test points, the cardiograph has failed the print test.

5 Press **Patient ID** to print a report or **Stop** to return to the previous screen. If the printer fails the test, try the test again. If the failure persists, contact the nearest Philips Response Center for further assistance, see “Contacting a Philips Response Center” on page 1-32.

RAM Test

The RAM Test verifies that the internal storage is operational and is not corrupt.

To perform the RAM Test:

1 From the Biomed Service Program, turn the Trim Knob to highlight **Test** and push to select it.

2 Turn the Trim Knob to highlight **Test RAM** and push to select it.

3 Turn the Trim Knob to highlight **Start** and push to select it.

4 The test results display on the screen. Press **Patient ID** to print a report or **Stop** to return to the previous screen. If the RAM fails the test, try the test again. If the failure persists, contact the nearest Philips Response Center for further assistance, see “Contacting a Philips Response Center” on page 1-32.

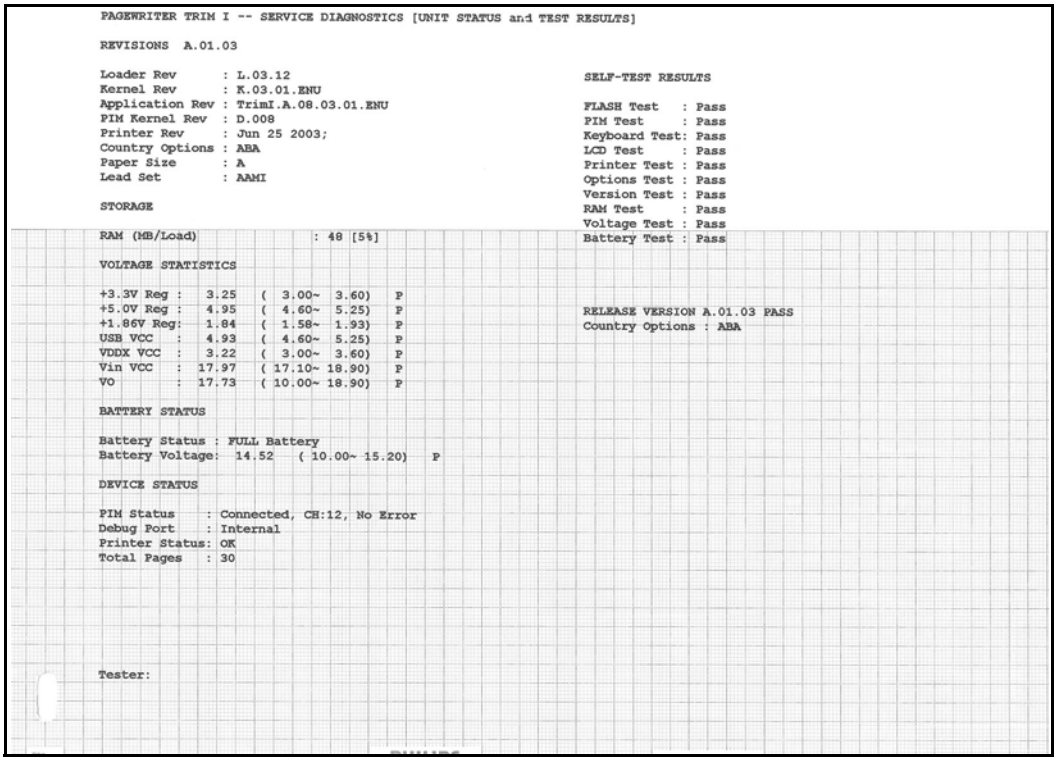
Self-Test

The Self-Test option will run all of the tests listed in Table 4-37. For information on any specific test, see the page number referenced in the table.

To run the self-test:

1. Select **Test** from the Main Menu.
2. Select **Self-Test** and then select **Start** to start the self-test program.
3. At the conclusion of the Self-Test, press the **Patient ID** button to print out a report of all test results.

Figure 4-13 Trim I Service Diagnostics Status Report



```
PAGEWRITER TRIM I -- SERVICE DIAGNOSTICS [UNIT STATUS and TEST RESULTS]

REVISIONS  A.01.03

Loader Rev      : L.03.12
Kernel Rev      : K.03.01.ENU
Application Rev : TrimI.A.08.03.01.ENU
PIM Kernel Rev  : D.008
Printer Rev     : Jun 25 2003;
Country Options : ABA
Paper Size      : A
Lead Set        : AAMI

STORAGE

RAM (MB/Load)              : 48 [5%]

VOLTAGE STATISTICS

+3.3V Reg :   3.25   (  3.00~  3.60)   P
+5.0V Reg :   4.95   (  4.60~  5.25)   P
+1.86V Reg:   1.84   (  1.58~  1.93)   P
USB VCC   :   4.93   (  4.60~  5.25)   P
VDDX VCC  :   3.22   (  3.00~  3.60)   P
Vin VCC   :  17.97   ( 17.10~ 18.90)   P
VO        :  17.73   ( 10.00~ 18.90)   P

BATTERY STATUS

Battery Status : FULL Battery
Battery Voltage:  14.52   ( 10.00~ 15.20)   P

DEVICE STATUS

PIM Status    : Connected, CH:12, No Error
Debug Port    : Internal
Printer Status: OK
Total Pages   : 30

Tester:

SELF-TEST RESULTS

FLASH Test    : Pass
PIM Test      : Pass
Keyboard Test: Pass
LCD Test      : Pass
Printer Test  : Pass
Options Test  : Pass
Version Test  : Pass
RAM Test      : Pass
Voltage Test  : Pass
Battery Test  : Pass

RELEASE VERSION A.01.03 PASS
Country Options : ABA
```

Version Test

The Version Test verifies that the version levels of the Application, Kernel, Loader, PIM Kernel, and Lead Set (AAMI or IEC) are consistent.

To perform the Version Test:

1. From the Biomed Service Program, turn the Trim Knob to highlight **Test** and push to select it.
2. Turn the Trim Knob to highlight **Test Version** and push to select it.
3. Turn the Trim Knob to highlight **Start** and push to select it.

4 The test results display on the screen. Press **Patient ID** to print a report or **Stop** to return to the previous screen.

NOTE The Version Test will fail if the PIM is not connected to the cardiograph.

Voltage Test

The Voltage Test verifies that the cardiograph is operating within acceptable voltage limits.

To perform the Voltage Test:

1 From the Biomed Service Program, turn the Trim Knob to highlight **Test** and push to select it.

2 Turn the Trim Knob to highlight **Test Voltage** and push to select it.

3 Turn the Trim Knob to highlight **Start** and push to select it.

4 The test results display on the screen. Press **Patient ID** to print a report or **Stop** to return to the previous screen.

5

Troubleshooting

This chapter provides information for localizing cardiograph problems to the subassembly level. This information is designed for use with the cardiograph's diagnostic self-tests to help you efficiently repair the cardiograph with a minimum of equipment.

Contacting a Philips Response Center

The Philips Response Center can assist with product troubleshooting and provide technical expertise to help with any issue with the PageWriter Trim cardiograph or any of its accessories. For a full listing of contact phone numbers, see "Contacting a Philips Response Center" on page 1-32.

Power On and Power Off Sequence

The following sequence of events occur during a normal warm or cold cardiograph boot.

Figure 5-14 Trim I Power On Sequence

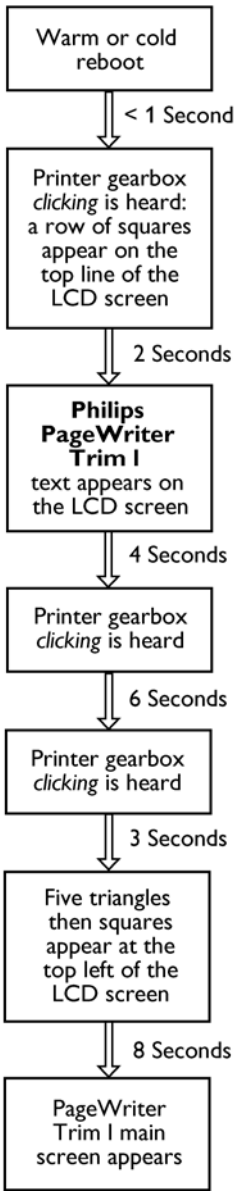

Warm or cold reboot
< 1 Second
Printer gearbox *clicking* is heard: a row of squares appear on the top line of the LCD screen
2 Seconds
Philips PageWriter Trim I text appears on the LCD screen
4 Seconds
Printer gearbox *clicking* is heard
6 Seconds
Printer gearbox *clicking* is heard
3 Seconds
Five triangles then squares appear at the top left of the LCD screen
8 Seconds
PageWriter Trim I main screen appears

Figure 5-15 Trim II/III/Rx Power On Sequence

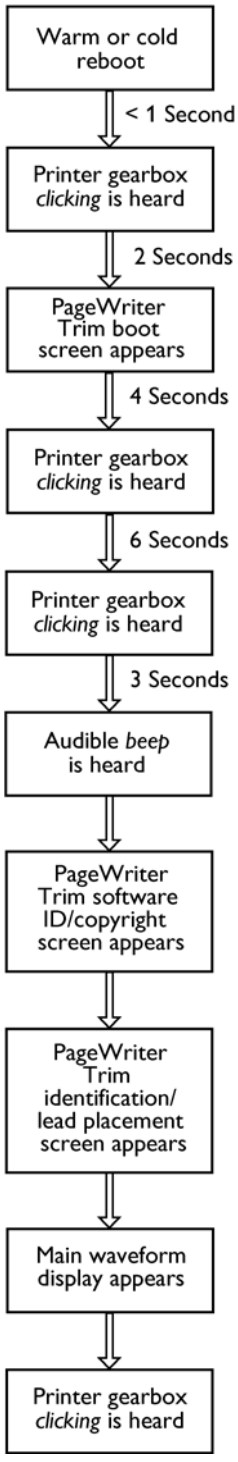

Warm or cold reboot
< 1 Second
Printer gearbox *clicking* is heard
2 Seconds
PageWriter Trim boot screen appears
4 Seconds
Printer gearbox *clicking* is heard
6 Seconds
Printer gearbox *clicking* is heard
3 Seconds
Audible *beep* is heard
PageWriter Trim software ID/copyright screen appears
PageWriter Trim identification/ lead placement screen appears
Main waveform display appears
Printer gearbox *clicking* is heard

Figure 5-16 Trim I Power Off Sequence

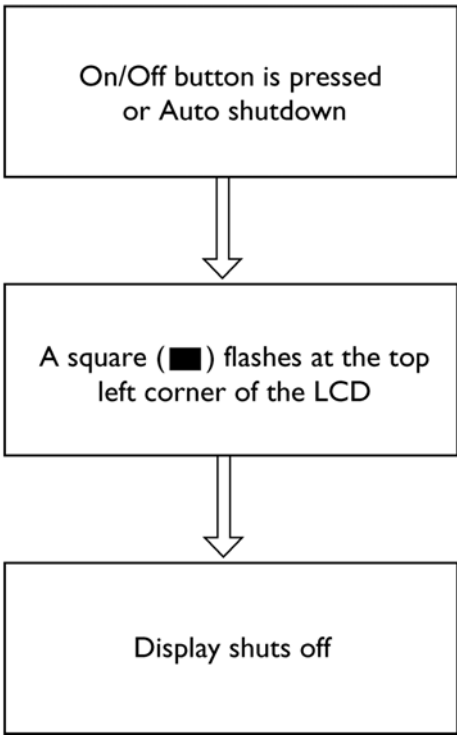
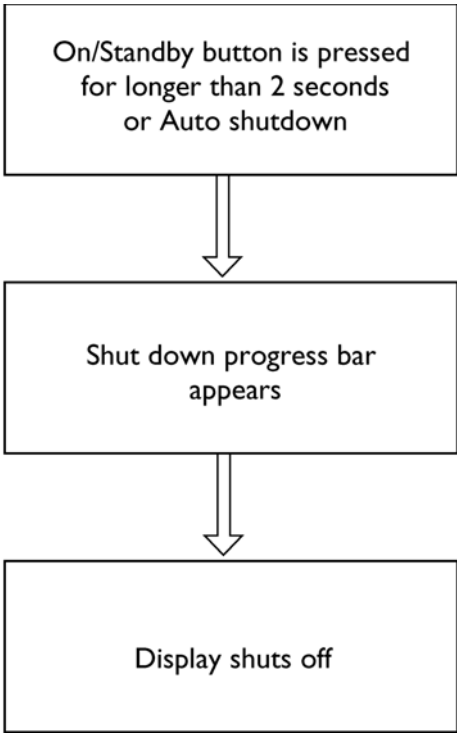


Figure 5-17 Trim II/III/Rx Power Off Sequence



Special Note About Software Version A.01.03

Please note that the power up sequence for software version A.01.03 may differ from the process described in Figure 5-14 and in Figure 5-15. There are circumstances where the power up sequence can be delayed by up to a maximum of 50 seconds. This can occur with installed software version A.01.03 when the PIM is not connected to the cardiograph (or a defective PIM is connected to the cardiograph) and AC power is applied to the cardiograph.

NOTE Always ensure that the Patient Interface Module (PIM) is connected to the cardiograph before pressing the On/Off button and returning the cardiograph to active use.

PageWriter Trim I Power Sequence

To return the cardiograph to active use if the PIM is not connected or a defective PIM is connected:

1. If the Patient Interface Module (PIM) is not connected to the cardiograph or a defective PIM is connected, press the On/Off button.
2. Five squares (■■■■■) will appear at the upper left corner of the display.
3. The display will then go blank for approximately 50 seconds.
4. The error code **0207** will appear on the display.
5. Press any key other than the On/Off key to return the cardiograph to active ECG mode use.
6. Connect the PIM or replace the defective PIM.
7. The cardiograph will operate normally and requires no further intervention.

PageWriter Trim II/III/Rx Power Sequence

To return the cardiograph to active use if the PIM is not connected or a defective PIM is connected:

1. If the Patient Interface Module (PIM) is not connected to the cardiograph or a defective PIM is connected, press the On/Off button. The power up sequence can take up to 50 seconds to complete.
2. The message **PIM test results. Please check the patient interface module connection** will appear.
3. Turn the Trim Knob to highlight **OK** and then press the Trim Knob to select it. The cardiograph can be returned to active ECG mode use.
4. Connect the PIM or replace the defective PIM.
5. The cardiograph will operate normally and requires no further intervention.

Troubleshooting Cardiograph Issues

The troubleshooting information in this section will help you to localize a fault and to correct it.

The following charts list symptoms and the steps to follow to investigate and solve the problem. Several failure mode symptoms may actually be hardware induced or triggered, and may require board replacement or opening of the cardiograph for inspection, please contact the Philips Response Center for further assistance. See "Contacting a Philips Response Center" on page 1-32.

Display Issues

Table 5-1 Display Issues

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
Screen is dark and shows no image	Cardiograph is in standby Action: Press the On/ Standby button on the front display.	Confirm the cardiograph wakes up.	User training on proper use of Standby.
	Contrast has been adjusted to the lowest degree	Confirm there is faint image in the LCD.	Push *Ctrl* and *down arrow* key simultaneously to adjust contrast high enough.
Screen is dark and shows no image	Power issue: AC cord Action: Inspect AC power connections.	AC is applied but AC Power On indicator LED is dark.	Ensure AC cord is not damaged and is plugged into appropriate live AC power socket.
	Power issue: Battery Action: Open battery compartment door and inspect battery condition.	AC is not attached and the battery is inserted into the cardiograph. Push the On/ Standby button. The screen remains dark.	Replace battery.
	Power issue: Supply	AC is applied but AC Power On indicator light is not lit. AC cord and connection are verified and are good.	Cardiograph must be serviced to replace power supply, contact Philips Medical Systems (see page 1-32).
	Power off mode failure	With battery plugged in, the printer is making a *clicking* sound every 6 seconds.	Press rear restart button to reset the cardiograph (see page 5-33).

Table 5-1 Display Issues *(continued)*

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
Screen is dark and shows no image	LCD panel failure	Replace with a new LCD panel to see if it functions normally.	Replace with a new LCD panel. Contact Philips Medical Systems (see page 1-32).
	LCD backlight board failure.	Replace with a new backlight board to see if the LCD functions normally.	Replace the LCD backlight board. Contact Philips Medical Systems (see page 1-32).
	Main controller board failure	With the battery plugged in, the printer is making a *clicking* sound every 6 seconds. Pressing the restart button (rear or cardiograph, page 5-33) does not reset the cardiograph.	Cardiograph must be serviced to replace main controller board, contact Philips Medical Systems (see page 1-32).
Screen shows CRC check failure	Application software is damaged	Cardiograph stops at the software identification/ copyright screen and a warning message appears that states **CRC failed**.	Reinstall software application (see page A-1) or (see page B-1). Confirm successful software installation (see page A-9) or (see page B-10).
A dialog shows software version information with a black background	File system is destroyed	The cardiograph remains on the black screen. A dialog shows software version information, including the loader and kernel version and the PCMCIA storage card status.	Wait 2 minutes and perform full software installation again (see page A-1) or (see page B-1). Confirm successful software installation (see page A-1) or (see page B-1).

Keyboard/Trim Knob/Dedicated Key Issues

Table 5-2 Keyboard/Trim Knob/Dedicated Key Issues

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
Keyboard is unresponsive	Keyboard controller subsystem has failed. Action: restart cardiograph using rear button (see page 5-33) and launch the Service Utility. Perform the Keyboard Test.	Unable to enter Service mode after restart. Keyboard is still unresponsive.	The cardiograph must be serviced to inspect and possibly replace the keyboard, cabling, or main controller board. Contact Philips Medical Systems for assistance (see page 1-32).
Keyboard is typing incorrect characters	Keyboard controller subsystem has failed. Action: Restart cardiograph using rear button and launch Service Utility (see page 4-7). Run the Keyboard Test.	Keyboard is now functional.	Occasional recoverable keyboard failures have been observed. If failures persist, cardiograph must be serviced to inspect and possibly replace keyboard, cabling, or controller board. Contact Philips Medical Systems for assistance (see page 1-32).
Keyboard is typing incorrect characters	Keyboard has Caps Lock enabled. Action: Inspect the incorrect typed characters on the display. If only the case of the characters is incorrect, press the **Caps Lock** key.	Do the characters now appear correctly?	User training on Caps Lock use.

Table 5-2 Keyboard/Trim Knob/Dedicated Key Issues *(continued)*

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
Keyboard is typing incorrect characters	Keyboard controller subsystem has failed. Action: restart cardiograph using rear button and launch Service Utility (see page 4-7). Run the Keyboard Test.	Keyboard is now functional.	Occasional recoverable keyboard failures have been observed. If failures persist, cardiograph must be serviced to inspect and possibly replace keyboard, cabling, or controller board. Contact Philips Medical Systems for assistance (see page 1-32).
	During a software installation procedure, the user selects an incorrect localization option that causes the wrong keyboard version to be selected. Registry is lost.	Try to upgrade the software kernel with the correct localization option. Try to upgrade the software application with the correct localization option.	Reinstall the software kernel and application and ensure that the correct localization option is selected (see page B-8).

Signal Acquisition Issues

Before attempting to troubleshoot a signal acquisition error as a mechanical issue, ensure that the following patient preparation and basic troubleshooting techniques have first been followed.

Always follow good skin and patient preparation techniques prior to taking an ECG. Proper skin preparation helps to ensure a good quality ECG. Skin is a poor conductor of electricity and frequently creates artifact that distorts the ECG signal.

To prepare the patient for an ECG:

1. Shave hair from electrode sites if necessary (excessive hair prevents a good connection).
2. Wash the skin thoroughly with soap and water.
3. Dry the skin vigorously to increase capillary blood flow to the tissues and to remove the dead, dry skin cells and oil.

NOTE **Do not use alcohol** to clean the skin because it dries the skin. If there is no time, rub the electrode sites with gauze to remove the dead, dry skin and to increase capillary flow.

4. Always use disposable electrodes, and ensure that the disposable electrodes have not expired. Place the electrodes on flat, fleshy parts of the arms and legs, and place all limb electrodes equal distance from the heart, at the same position on each limb. If a limb site is not available (amputation, injury) place the electrodes closer to the torso.
5. For female patients, always place the electrodes on top of the breast (not underneath the breast tissue).
6. Ensure that all electrodes are firmly attached, and that the lead wires are not pulling on the electrodes. If the electrodes can be moved easily, the electrode connection is too loose.
7. Reassure the patient and make sure that the patient is comfortable. If the patient has tremors, attach the limb electrodes higher on the patient (closer to the torso), and assist with limiting patient moving while taking the ECG.

After ensuring that proper patient preparation techniques are being followed, and that fresh electrodes are being applied to the patient, review the following table for further assistance.

Table 5-3 Signal Acquisition Issues

Symptom	Possible Cause & Investigation Step	Solution
All leads show leads off (red dashed line) *continuously*	PIM communications have been lost due to USB patient data cable connection failure, or defective leads are connected to the PIM.	**1** Check that PIM patient data cable is firmly seated to the PIM connector ( ) on the rear of the cardiograph. **2** If the PIM is firmly attached, perform the PIM test as described in "Maintenance Tests (Trim II/III/Rx only)" on page 4-1, or for the Trim I as described in "Trim I Diagnostic and Performance Verification Tests" on page 4-17. If the PIM Test fails, replace the patient data cable. If the PIM Test continues to fail with a new patient data cable attached, replace the entire PIM PCA Set. Contact Philips Medical Systems for further assistance (see page 1-32). **3** If the PIM test passes, ensure that all lead wires are fully seated in the PIM lead connectors. **4** Ensure that all lead wires are intact and that there are no cracks visible in any of the lead wires. **5** Connect all of the lead wires to a metallic conductive surface or to a shortening bar. – Check the Leads off indicator on the Status Bar. Ensure that no leads are being reported as leads off. – If any of the precordial leads report as leads off, with all limb leads connected, replace the precordial lead(s). – If all leads report as leads off, replace the RL/R lead with a lead that known to function normally. If the new lead connected to the RL/R connector functions normally, replace the defective RL lead. Once the RL/R lead is operable, proceed to replace any other leads that display as leads off. – If the RL/R lead still displays leads off, the cardiograph will require internal repair, contact Philips Medical Systems for further assistance (see page 1-32).

Table 5-3 Signal Acquisition Issues *(continued)*

Symptom	Possible Cause & Investigation Step	Solution
One or more leads show leads off (red dashed line) *periodically*	Improper or incomplete patient and skin preparation techniques	Ensure that good patient preparation and skin preparation techniques have been followed as described on page 5-10.
	Improperly attached electrodes or lead wires; expired disposable gel electrodes	Ensure that the lead adapters are clean and have a tight fit. Ensure that the electrodes are within their shelf life and are firmly attached to the patient.
	Defib or high noise event Action: Observe frequency and recovery behavior.	The PIM performs an automatic ranging action when input signals vary significantly. If this behavior persists in the absence of electrode movement or defib events, the cardiograph should be serviced to inspect and possibly replace the PIM or lead cables. Contact Philips Medical Systems for further assistance (see page 1-32).

Table 5-3 Signal Acquisition Issues *(continued)*

Symptom	Possible Cause & Investigation Step	Solution
One or more leads show leads off (red dashed line) *periodically*	PIM communications have been lost due to USB patient data cable connection failure, or defective leads are connected to the PIM.	**1** Check that PIM patient data cable is firmly seated to the PIM connector ( ) on the rear of the cardiograph. **2** If the PIM is firmly attached, perform the PIM test as described in "Maintenance Tests (Trim II/III/Rx only)" on page 4-1, or for the Trim I as described in "Trim I Diagnostic and Performance Verification Tests" on page 4-17. If the PIM Test fails, replace the patient data cable. If the PIM Test continues to fail with a new patient data cable attached, replace the entire PIM PCA Set. Contact Philips Medical Systems for further assistance (see page 1-32). **3** If the PIM test passes, ensure that all lead wires are fully seated in the PIM lead connectors. **4** Ensure that all lead wires are intact and that there are no visible cracks in the lead wires. **5** Connect all of the lead wires to a metallic conductive surface or to a shortening bar. – Check the Leads off indicator on the Status Bar. Ensure that no leads are being reported as leads off. – If any of the precordial leads report as leads off, with all limb leads connected, replace the precordial lead(s). – If all leads report as leads off, replace the RL/R lead with a lead that known to function normally. If the new lead connected to the RL/R connector functions normally, replace the defective RL lead. Once the RL/R lead is operable, proceed to replace any other leads that display as leads off. – If the RL/R lead still displays leads off, the cardiograph will require internal repair, contact Philips Medical Systems for further assistance (see page 1-32).

Table 5-3 Signal Acquisition Issues *(continued)*

Symptom	Possible Cause & Investigation Step	Solution
One or more leads show leads off (red dashed line) *periodically*		**6** If replacing the lead wires does not resolve signal quality issues, check the **PIM Kernel Revision** field in the Service Utility (see page 4-7). – If the PIM Kernel version is **G.001**, upgrade the cardiograph software to version A.01.03. If the signal quality issues persist with software version A.01.03 installed, replace the PIM PCA sets. Contact Philips Medical Systems for further assistance (see page 1-32). – If the PIM Kernel version is **D.008**, and the cardiograph passes the PIM Test (page 4-1) or (page 4-17), replace the PIM PCA sets. Contact Philips Medical Systems for further assistance (see page 1-32). – After PIM PCA set replacement, upgrade the cardiograph to software version A.0.1.03 that includes PIM Kernel version **G.003**.

Real Time Screen Issues

Table 5-4 Real Time Screen Issues

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
Waveform display is no longer updating, system is unresponsive	Main controller board failure Action: Wait for 2 minutes or longer. The cardiograph will restart automatically, or you can restart it by pushing the restart button (page 5-33).	Restart the cardiograph to see if the cardiograph can operate normally.	The cardiograph must be serviced to inspect and possibly upgrade kernel and application or replace main controller board. Contact Philips Medical Systems for further assistance (see page 1-32).
System seems to be running slowly after boot-up	Duplicate static IP configured for network Action: Confirm that the static IP assigned is not already in use on LAN.	IP was already in use.	It has been observed that boot up and operation can initially be slower when the PageWriter Trim is configured for an IP address that is already in use on the network.

Archive Screen Issues

Table 5-5 Archive Screen Issues

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
After attempting an Archive screen operation, an error message appears: **Command timed-out**	The TraceMaster ECG Management system is busy. Action: Retry TraceMaster operation.	Operation succeeds on subsequent try.	Transfer operations use network and server resource, which may occasionally be unable to service the requests.
After attempting an Archive screen operation, an error message appears: **Requested Function Failed**	Network or modem phone line was interrupted during operation. Action: Retry operation. Inspect cabling to network or analog phone line.	Operation succeeds on subsequent try or damaged cabling or intermittent connection found.	Transfer or query operations require reliable access to the network transport.
	Selected removable media (PC card, USB memory stick) was not fully inserted into the slot on the cardiograph. Action: Verify that selected removable media (PC card, USB memory stick) is inserted correctly.	Removable media (PC card, USB memory stick) is not fully inserted or is not operational.	Attempting to save ECGs to removable media (PC card, USB memory stick) that is not accessible will result in an error message. Retry the operation with fully functioning removable media that is fully inserted into the applicable slot on the cardiograph.
	An attempt to transfer an unsupported ECG report type was made to TraceMaster Action: Inspect ECG that failed the requested operation for selected format (report type).	Format is Pan-12 or 12x1.	Certain ECG report types are not supported by and will be rejected by the TraceMaster ECG Management System.
	A wireless LAN connection is being used to transfer ECGs to TraceMaster and LEAP credentials are not enabled.	LEAP credentials are enabled and the ECG transfer subsequently completes.	See “Enabling LEAP Credentials” on page C-10.

Table 5-5 Archive Screen Issues *(continued)*

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
When an error occurs during transfer of multiple ECGs to a TraceMaster system, the transfer process does not continue and transferred files are not deleted.	Application limitation Action: None.	Current system limitation.	The current PageWriter Trim operations fail in a known safe manner when multiple ECG transfer operations are interrupted. Retry the transfer for the remaining ECGs.
After pressing the **Archive** button, it takes longer than 40 seconds before the Archive list is displayed when the main archive has more than 130 ECGs stored.	System slow-down from full ECG database Action: Save or delete ECGs from the Main Archive.	Entry into the Archive Screen is faster.	There is a known system performance impact when the near maximum number of ECGs have been stored in the main archive area.
The message **Requested Function Failure** appears after fax ECG transmission has completed.	Fax application time-out. Action: Close the Fax dialog box after transmission completes by touching **OK**.	Message no longer appears after FAX ECG transmission.	The FAX application requires the user to close the dialog box after successful transmission. Otherwise, the operation times out and indicates a failure.
Transfer of ECGs to an external PC card or USB memory stick fails and there are still less than 200 ECGs on the removable media device.	PC card or USB memory stick file system limitation Action: Delete extra non-ECG files from the PC card or USB memory stick.	ECGs can now be transferred.	Delete unwanted files from the PC card or USB memory stick.

Table 5-5 Archive Screen Issues *(continued)*

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
Some ECGs retrieved from TraceMaster and printed on the cardiograph look different from TraceMaster prints or XLi printouts.	Older or non-PageWriter Trim source ECG files were retrieved. Action: Inspect the printed report date and information	ECG was not created by a PageWriter Trim cardiograph.	Retrieving and printing older ECG files that were not sourced by the PageWriter Trim cardiograph can have the following differences when printed: ■ Algorithm version appears as HPxxx on TraceMaster and PH on PageWriter Trim. ■ Pacer tick marks are not present on PageWriter Trim printout. ■ Frank lead system generates 3 rhythm traces with flat line and no lead label on PageWriter Trim printout. ■ Custom lead names do not appear on PageWriter Trim printout. ■ PageWriter Trim prints full interpretations regardless of original Xli ECG settings.

Configuration Screen Issues

Table 5-6 Configuration Screen Issues

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
Can not enter the configuration window	Forgot password.		Contact Philips Medical Systems for further assistance (page 1-32).

Printer Issues

Table 5-7 PageWriter Trim I Printer Issues Software Version A.00.03 and lower

Error Code	Possible Cause & Investigation Step	Solution
0201	No battery or dead battery.	**1** Replace battery. **2** Replace motherboard, contact Philips Medical Systems for further assistance (page 1-32). **3** Replace power supply cord.
0202	UPR running: a new print job has been sent to the printer and the printer cannot accept a new print job.	Follow the procedure to restart the cardiograph (see page 5-33).
0203	■ Paper drawer is not fully closed ■ Out of paper, or paper loaded incorrectly ■ Application error	**1** Open and firmly close the printer drawer. **2** Open the printer drawer and check to make sure that the paper is properly inserted and aligned. **3** Follow the procedure to restart the cardiograph (see page 5-33). **4** It has been observed that on rare occasions a **Printer Door Open** message cannot be dismissed because of overlapping simultaneous error status reporting.
0204	■ Paper jam ■ Paper is not loaded correctly ■ Defective TOF sensor assembly ■ Defective paper tray assembly	**1** Open and firmly close the printer drawer. **2** Open the printer drawer and check to make sure that the paper is properly inserted and aligned. **3** Replace TOF sensor assembly, contact Philips Medical Systems for further assistance (page 1-32). **4** Replace paper tray assembly.
0205	No paper is in drawer	Insert paper into drawer.

Table 5-7 PageWriter Trim I Printer Issues Software Version A.00.03 and lower *(continued)*

Error Code	Possible Cause & Investigation Step	Solution
0206	Temperature shutdown: the temperature of the print head is too high	**1** Shut down cardiograph and wait 20 minutes. **2** If error persists, send cardiograph for repair, contact Philips Medical Systems for further assistance (page 1-32).
0207	Unknown error	**1** Shut down cardiograph **2** Remove battery **3** Reinsert battery and press On/ Standby button **4** If error persists, contact Philips Medical Systems for further assistance (see page 1-32).

Table 5-8 PageWriter Trim I Printer Issues Software Version A.01.00 and higher

Error Code	Possible Cause & Investigation Step	Solution
0101	Start Up CRC Failure	Reinstall the cardiograph software (see page A-1).
0201	USB printer - No USB connection	Restart the cardiograph.
0202	USB printer - running (busy)	Restart the cardiograph.
0203	USB printer - door open	**1** Open and firmly close the printer drawer. **2** Open the printer drawer and check to make sure that the paper is properly inserted and aligned. **3** Follow the procedure to restart the cardiograph (see page 5-33). **4** It has been observed that on rare occasions a **Printer Door Open** message cannot be dismissed because of overlapping simultaneous error status reporting.

Table 5-8 PageWriter Trim I Printer Issues Software Version A.01.00 and higher *(continued)*

Error Code	Possible Cause & Investigation Step	Solution
0204	USB printer - paper jam or out of paper	**1** Open and firmly close the printer drawer. **2** Insert paper into drawer, if necessary. **3** Open the printer drawer and check to make sure that the paper is properly inserted and aligned. **4** Replace TOF sensor assembly, contact Philips Medical Systems for further assistance (page 1-32). **5** Replace paper tray assembly.
0207	No PIM or defective PIM is connected to cardiograph when powered up with software version A.01.03 installed, or some other unknown error (software version A.01.02 or lower)	If software version A.01.03 is installed, follow the directions on page 5-5. If software version A.01.02 or lower is installed, perform the following steps: **1** Shut down cardiograph. **2** Remove battery. **3** Reinsert battery and press On/ Standby button. **4** If error persists, contact Philips Medical Systems for further assistance (see page 1-32).
All other errors	Unknown error	Contact Philips Medical Systems for further assistance (see page 1-32).

Table 5-9 PageWriter Trim II/III/Rx Printer Issues

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
After the paper drawer was opened during printing, the print image was corrupted or incorrect.	Printer controller error Action: None	Printing continued on second page when only one page was expected.	Occasional printer controller status errors can occur when opening the paper drawer during printing.

Table 5-9 PageWriter Trim II/III/Rx Printer Issues *(continued)*

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
After the paper drawer was opened during printing, the print image was corrupted or incorrect and the paper does not stop feeding.	Printer controller error Action: Press the rear restart button (see page 5-33).	The cardiograph restarts and boots correctly. Paper stops feeding.	Occasional printer controller status errors can occur when opening the paper drawer during printing.
The message **Printer Door is Open** appears, and the cardiograph is not responding.	Application error Action: Press the rear restart button (see page 5-33).	The cardiograph restarts and boots correctly.	It has been observed that on rare occasions a **Printer Door Open** message cannot be dismissed because of overlapping simultaneous error status reporting.
The message **Check Printer** appears with no apparent printer problem present.	Printer controller error Action: Open and close printer paper drawer.	Message does not reoccur.	Infrequently, the printer controller may indicate a printer mechanism status error when no error exists. This has been noted specifically when A4 paper is in use.
Printed report looks too small or compressed.	Printer controller error Action: Press the rear restart button (see page 5-33).	Cardiograph restarts and boots correctly. Reports print correctly.	On very rare occasions, reports with A4 paper show a compressed image. Restart the cardiograph to resolve the issue.
After opening and closing the paper drawer rapidly many times, the cardiograph was unresponsive.	Printer controller error Action: Press the rear restart button (see page 5-33).	Cardiograph restarts and boots correctly. Reports print correctly.	A rapid and sustained repeating open-and-close action on the paper drawer can cause an application error related to printer status handling.

Table 5-9 PageWriter Trim II/III/Rx Printer Issues *(continued)*

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
Printer Error: Out of Paper/Paper Jam/ Door Open	■ Paper drawer is not fully closed ■ Out of paper, or paper loaded incorrectly ■ Defective TOF sensor assembly ■ Defective paper tray assembly	Error does not occur again.	■ Open and firmly close the paper drawer. ■ Open paper drawer and check to make sure paper is aligned correctly. ■ Replace TOF sensor assembly, contact Philips Medical Systems for further assistance (page 1-32). ■ Replace paper tray assembly.
Printer not detected message	■ Application error ■ Unseated or defective main harness assembly ■ Defective printer control board	Message no longer appears.	■ Press the rear restart button (see page 5-33). ■ Check seating of main harness assembly. Replace if necessary, contact Philips Medical Systems for further assistance (page 1-32). ■ Replace the printer control board, contact Philips Medical Systems for further assistance (page 1-32).
Paper does not advance	■ Application error ■ Defective TOF sensor assembly ■ Defective printer gearbox assembly	Paper advances correctly.	■ Press the rear restart button. ■ Replace the TOF sensor assembly, contact Philips Medical Systems for further assistance (page 1-32). ■ Replace the printer gearbox assembly, contact Philips Medical Systems for further assistance (page 1-32).

Table 5-9 PageWriter Trim II/III/Rx Printer Issues *(continued)*

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
Paper does not tear off cleanly, or paper stops at the wrong spot	■ Wrong paper size setting. ■ Wrong method is being used to tear off paper.	Paper tears cleanly and advances correctly.	■ Check that paper size is correctly set in the cardiograph configuration. ■ Refer to the *PageWriter Trim Instructions for Use* for proper method for tearing paper.
Blank pages printed after ECG report	Wrong paper size setting	No blank pages print after changing paper size.	Check that paper size is correctly set in the cardiograph configuration.
On Chinese cardiograph, test report is missing Chinese characters	Only the Chinese application is updated on an English language option cardiograph.	ECG report print correctly after the software application is reinstalled.	Reinstall the software application and kernel using the **Install All** option (see page B-1).
All other errors	Unknown error		Contact Philips Medical Systems for further assistance (see page 1-32).

PC Card/USB Memory Stick Issues

Table 5-10 PC Card / USB Memory Stick Issues

Symptom	Possible Cause & Investigation Step	Confirmation	Solution
Occasionally, copying ECGs from archive to a PC card/ USB Memory Stick fails.	PC card or USB memory stick subsystem time-out failure Action: Retry the transfer operation.	Operation succeeds without error.	Write operations occasionally fail for PC card/USB memory stick. If this condition reoccurs persistently, replace the PC card/USB Memory Stick.
Modem is unavailable after removing and reinserting the PC card or reconnecting USB Memory Stick into the cardiograph.	Main controller error Action: Press the On/ Standby button to put the cardiograph into Standby. Then, press the restart button (see page 5-33).	Modem is now available.	Hot-swapping the modem after system boot is not supported. You must restart the cardiograph when reinserting the modem PC card or reconnecting the USB Memory Stick.

Software Installation Issues

Table 5-11 Software Installation Issues

Symptom	Possible Cause & Investigation Step	Possible Solutions
An error message appears during software installation that an incorrect model, incorrect token, or invalid token key is being installed.	The PC card used for software installation is not fully inserted into the PC card slot before the cardiograph was powered up. The software installation files contained on the PC card are for the incorrect product model. The token key is invalid. The cardiograph serial number is invalid.	Ensure that the PC card contains the necessary files and is not defective. Ensure that the PC card is fully inserted into the slot on the cardiograph before the On/Standby button is pressed. Check the PC card slot to ensure that there are no broken pins on the mainboard connector. Click the **Refresh from Source** button on the Software Installation screen. If no proposed revisions are found, the PC card was not fully inserted into the slot before On/Standby button was pressed. The Software Application files saved to the PC card are not for the correct product model. For example, you can only install PageWriter Trim III software on a PageWriter Trim III cardiograph. Download from InCenter the correct software files applicable for your cardiograph model. On the **Please Input Serial Number and Token** screen, ensure that the entered information is accurate. If the displayed serial number is not identical to the serial number of the cardiograph (displayed on the rear label next to the **SN** text, contact Philips Medical Systems for further assistance (see page 1-32).

Wireless Troubleshooting

All wireless LAN troubleshooting topics are included in this section. For further assistance with configuring the cardiograph for wireless transmission to a TraceMasterVue ECG Management System, see the *Installing TraceMasterVue and Configuring Communication Guide* available for download from the Philips InCenter web site (incenter.medical.philips.com).

Table 5-12 Aironet Client Utility (ACU) Error Messages

Error Message	Possible Cause	Recommended Solution
■ Cisco Wireless LAN Adapter Not Found! ■ Client Adapter Not Found	■ The Aironet Client Utility was launched without the wireless adapter being inserted into the cardiograph ■ The wireless adapter was ejected from the cardiograph	**1** Select **OK** to close the error message. **2** Press the On/Standby button on the cardiograph. **3** Insert the wireless adapter into the PC card slot. **4** Press the On/Standby button.
WEP Key *X* Must Be 10 Hex Digits!	■ An invalid number of characters or an incorrect character was entered for the WEP key indicated. ■ 40-bit keys must have 10 total characters.	**1** Select **OK** to close the error message. **2** Reenter the characters for the invalid key.
WEP Key *X* Must Be 26 Hex Digits!	■ An invalid number of characters or an incorrect character was entered for the WEP key indicated. ■ 128-bit keys must have 26 characters.	**1** Select **OK** to close the error message. **2** Reenter the characters for the invalid key.
You must enter a WEP Key!	A WEP key was not entered on the WEP keys window.	**1** Select **OK** to close the error message. **2** Enter a WEP key in the WEP Keys window.
350 Series Radio is Not Associated	The wireless adapter is not associated to an access point.	■ There are several reasons why the wireless adapter may not be associated to an access point. ■ Follow the steps in the procedure “Checking the Wireless Adapter Association to an Access Point” on page 5-31.

Table 5-13 PageWriter Trim Cardiograph Wireless Error Messages

Error Message	Possible Cause	Recommended Solution
Unidentified PC card Adapter: Enter the name of the PC card driver. Driver name:_____	■ The wireless adapter is inserted incorrectly into the PC card slot on the cardiograph ■ The wireless adapter was inserted into the cardiograph when the cardiograph was in active use (not in Standby mode) ■ An unsupported wireless adapter was inserted into the cardiograph	**1** Press the *Esc* key to close the dialog. **2** Press the On/Standby button on the cardiograph. **3** Insert the wireless adapter card into the PC card slot. **4** Press the Reset button on the rear panel of the cardiograph. For more information, see Chapter 7 of the *PageWriter Trim Cardiograph Instructions for Use*.

Table 5-14 PageWriter Trim Cardiograph ECG Transmission Error Messages

Error Message	Possible Cause	Recommended Solution
No Reply Received From Remote Site Server	■ The wireless connection to the access point does not exist ■ The network connection to the TraceMasterVue Remote Site server does not exist or is not configured properly ■ The cardiograph did not receive a response from the TraceMasterVue Remote Site server within a specified period of time	Follow the steps in the procedure "Checking the Remote Site Server Connection" on page 5-27.
Unexpected Reply Received from Remote Site	A connection to the TraceMasterVue Remote Site server exists, but the server is not properly acknowledging receipt of the packet data.	Follow the steps in the procedure "Resolving an Unexplained Reply Received from the Remote Site" on page 5-30.

Checking the Remote Site Server Connection

Use the following procedure to check that the wireless adapter is communicating with a TraceMasterVue Remote Site.

To check the remote site server connection:

1 Check the LEDs on the wireless adapter. See Table 5-15 for further steps.

Table 5-15 LED Indicators

LED Indicators	Recommended Solution
Red LED: blinking quickly Green LED: blinking quickly	■ Move the cardiograph to an area with a strong wireless signal. The green LED should then blink slowly or turn off completely indicating that the wireless adapter is associated with an access point. ■ If the green LED continues to blink quickly indicating that the wireless adapter is still not associated to an access point, follow the steps in the procedure "Checking the Wireless Adapter Association to an Access Point" on page 5-31.
Red LED: off Green LED: off	■ Ensure that the wireless adapter is securely inserted into the PC card slot on the rear of the cardiograph. ■ Push the On/Standby button to put the cardiograph into Standby. ■ Push the On/Standby button again. ■ Check the status LEDs on the wireless adapter. If the LEDs are still not illuminated, contact the Philips Response Center for further assistance.
Red LED: blinking quickly Green LED: off or blinking slowly	The wireless adapter is associated to an access point. Go to Step 2 in this procedure.

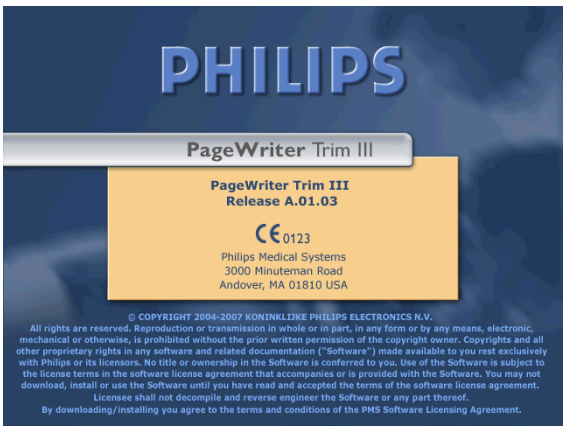
2 Press the On/Standby button for three seconds, then release it to shut down the cardiograph.

3 Connect a USB mouse to the USB port ( ) on the rear of the cardiograph.

4 Press the On/Standby button.

5 When the software identification screen appears, press the *Ctrl* (Ctrl) + *Shift* (⇧) + 6 (& 6 ¾) keys at the same time.

Figure 5-18 PageWriter Trim Software Identification Screen


PHILIPS
PageWriter Trim III
PageWriter Trim III
Release A.01.03
CE 0123
Philips Medical Systems
3000 Minuteman Road
Andover, MA 01810 USA
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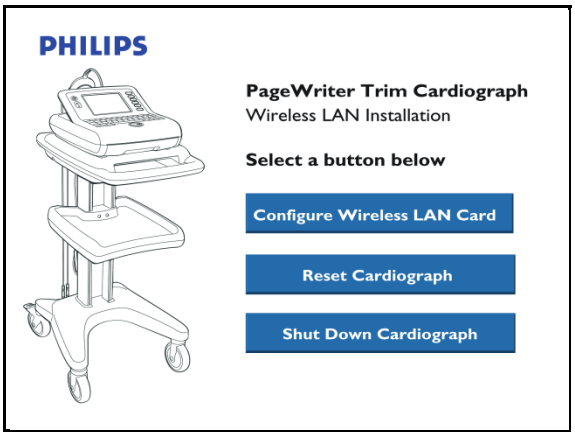
6 The PageWriter Trim Wireless LAN Installation screen appears. Click on the **Configure Wireless LAN Card** button.

Figure 5-19 PageWriter Trim Wireless LAN Installation screen



7 The Aironet Client Utility (ACU) window appears. Click the **Status** tab. If green or yellow bars appear on the **Signal Strength** or **Signal Quality** fields, this indicates an active connection. If the bars are red, try moving the cardiograph to an area with a stronger wireless signal. For information on performing additional diagnostic tests from the Status tab, see the *Cisco Aironet Wireless LAN Client Adapters Installation and Configuration Guide for Windows CE* available for download from: www.cisco.com.

8 Verify that the IP address information on the cardiograph network screen is correct (DHCP or Static IP) and that the computer name is also correct.The DHCP IP address is displayed on the ACU screen. If DHCP is being used, the DHCP lease may have expired. To reacquire an IP address, press the On/Standby button on the cardiograph to enter Standby, then press the button again to return the cardiograph to active use.

9 Ping the TraceMasterVue server from the cardiograph. Follow the procedure in Table 5-

Table 5-16 Pinging the TraceMasterVue server from the cardiograph

To ping the TraceMasterVue server from the PageWriter Trim cardiograph:

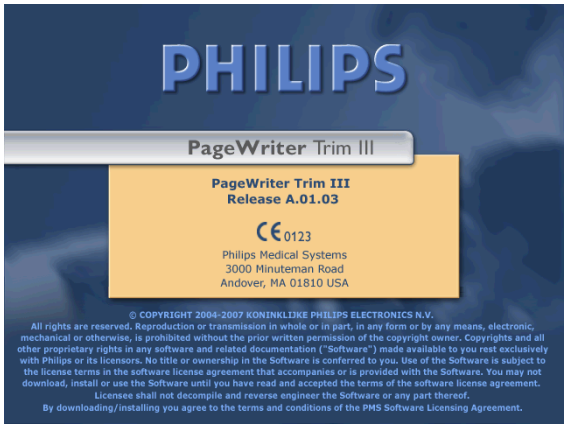
1 If the cardiograph is in active use, press the On/Standby button for three seconds, then release it to shut down the cardiograph.

2 Connect a USB mouse to the USB port ( ) on the rear cardiograph (if not previously connected).

3 Press the On/Standby button to restart the cardiograph. When the PageWriter Trim software identification screen appears, press *Ctrl* ( ) + *Shift* ( ) + the Trim Knob at the same time.

Note: The software identification screen disappears after five seconds. If the key sequence is not entered in time, restart the cardiograph.

Figure 5-20 PageWriter Trim Software Identification Screen


PHILIPS
PageWriter Trim III
PageWriter Trim III
Release A.01.03
CE 0123
Philips Medical Systems
3000 Minuteman Road
Andover, MA 01810 USA
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4 An Access Code window appears. If the Access Code window does not appear, try the left *CTRL+SHIFT+Trim Knob* sequence again.

5 Type in **1573**. The Service Utility screen appears.

6 Click on the pull-down menu under **Diagnostic Tests**. Press the up or down arrow key (on keyboard) to select **Network Ping**.

7 Click the **Start** button. The Ping Test window appears.

8 Type in the IP address of the TraceMasterVue server. Click the **Ping** button.

If the test succeeds, ensure that you can ping the cardiograph from the server, as described next. Then retest ECG transmission.

If the test fails, ping the access point. Consult your network administrator for information on pinging the access point.

Table 5-16 Pinging the TraceMasterVue server from the cardiograph

To ping the cardiograph from the server:
Before proceeding, have available the IP address of the target cardiograph. **1** On the TraceMasterVue server, select **Start > Run**, and type **cmd** in the Run dialog box. **2** In the Command shell, type the following: **ping <cardiograph IP address>** For example, **ping 161.99.23.55**

16.

10 If the access point ping test fails, most likely there is an IP configuration issue. Consult your network administrator for further assistance. It may be helpful to connect the cardiograph to a hardwired Ethernet connection for further IP configuration troubleshooting.

Resolving an Unexplained Reply Received from the Remote Site

Use the following procedure if the error message **Unexpected Reply received from Remote Site** appears when transmitting ECGs to a TraceMasterVue ECG Management System.

To resolve an unexplained reply received from the remote site:

1 On the Configuration screen, under the **Remote Sites** tab, check that the Remote Site server URL is in the correct format. Ensure that the Remote Site Server URL includes a forward slash at the end of the URL. An example of a valid URL is:
http://192.168.0.1/EMSCOMM/

2 If the URL is correct, consult the TraceMasterVue system administrator for more information. The TraceMasterVue server may need to be reset.

Checking the Wireless Adapter Association to an Access Point

Use the following procedure when a wireless adapter is not associating with an access point.

1 Check the LEDs on the wireless adapter. See Table 5-17 for further steps.

Table 5-17 LED Indicators

LED Indicators	Recommended Solution
Red LED: blinking quickly Green LED: blinking quickly	1 Move the cardiograph to an area with a strong wireless signal. The green LED should then blink slowly or turn off completely indicating that the wireless adapter is associated with an access point. 2 If the green LED continues to blink quickly indicating that the wireless adapter is still not associated to an access point, go to step 2 in this procedure. 3 If LEAP authentication is used, ensure that the LEAP credentials are enabled. For more information, See "Enabling LEAP Credentials" on page C-10..
Red LED: off Green LED: off	1 Ensure that the wireless adapter is securely inserted into the PC card slot on the rear of the cardiograph. 2 Press the On/Standby button to put the cardiograph into Standby. 3 Press the On/Standby button again. 4 Check the status LEDs on the wireless adapter. If the LEDs are still not illuminated, contact the Philips Response Center for further assistance.
Red LED: blinking quickly Green LED: off or blinking slowly	The wireless adapter is associated to an access point. Go to Step 2 in this procedure.

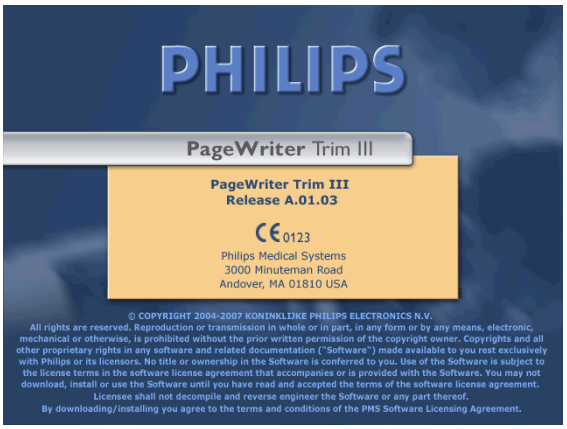
2 Press the On/Standby button for three seconds, then release it to shut down the cardiograph.

3 Connect a USB mouse to the USB port ( ) on the rear of the cardiograph.

4 Press the On/Standby button.

5 When the software identification screen appears, press the *Ctrl* ( ) + *Shift* ( ) + 6 ( ) keys at the same time.

Figure 5-21 PageWriter Trim Software Identification Screen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PageWriter Trim III
PageWriter Trim III
Release A.01.03
CE 0123
Philips Medical Systems
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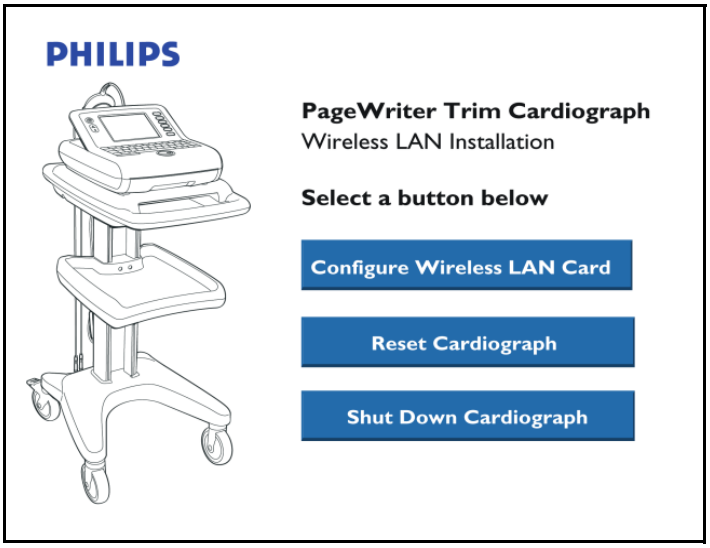
6 The PageWriter Trim Wireless LAN Installation screen appears. Click on the **Configure Wireless LAN Card** button.

Figure 5-22 PageWriter Trim Wireless LAN Installation screen



7 The Aironet Client Utility (ACU) window appears. Ensure that the correct profile is selected in the **Select Active Profile** drop-down list.

8 Ensure that the message **350 Series Radio is Associated** appears on the ACU window. If it does not, proceed to step 9.

9 Ensure that the access point is turned on and is operating.

10 If the wireless adapter still cannot associate with the access point, contact your network administrator to ensure that all settings are correct for both the wireless adapter and for the access point.

– If MAC or IP filtering is enabled at the access point, ensure that the wireless adapter MAC address or IP address is added to the list.

– If multiple static WEP keys are being used, the transmit key must be configured as the first WEP key. On the access point, the first WEP key must match the first key on the wireless adapter.
– If LEAP authentication is used, ensure that the LEAP credentials are enabled. For more information, See "Enabling LEAP Credentials" on page C-10.

For further information see the *Cisco Aironet Wireless LAN Client Adapters Installation and Configuration Guide for Windows CE* available for download from: www.cisco.com.

Restarting the Cardiograph

To restart the cardiograph:

1. Press the On/Standby button for 2-3 seconds to shut down the cardiograph.
2. Press the On/Standby button again to power on the cardiograph.
3. If steps 1 and 2 do not work, press the restart button (rear of cardiograph). See Figure 5-1 and Figure 5-2.

   After approximately 20 seconds, the PageWriter Trim II/III/Rx software identification screen appears, followed by an audible beep. For the PageWriter Trim I, the screen with five triangles appears.

Figure 5-1 Rebooting the Cardiograph (Trim II/III/Rx)

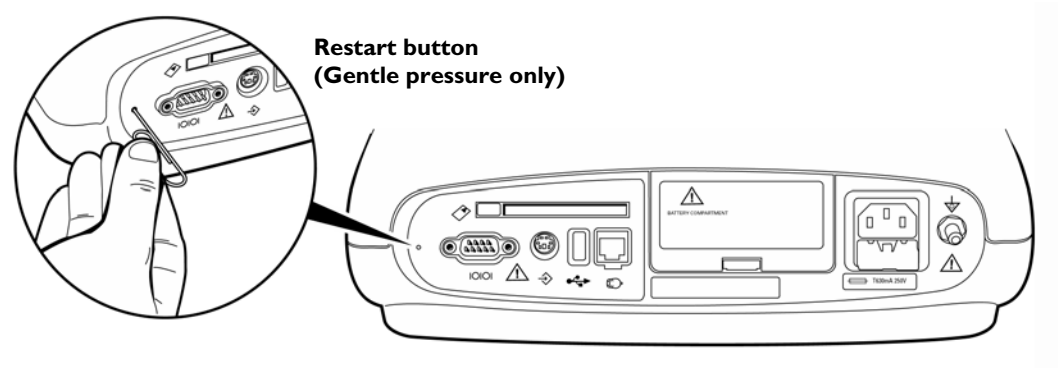
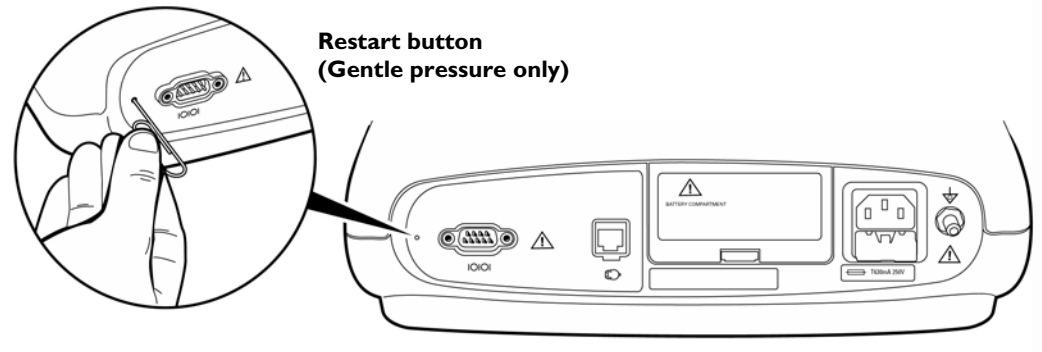


Figure 5-2 Rebooting the Cardiograph (Trim I)



6

Performance Verification and Safety Tests

This chapter describes the tests and inspections required to verify performance of the PageWriter Trim cardiograph following a service event.

Required Testing Levels

The Performance Verification Tests verify proper operation of the PageWriter Trim cardiograph following a service event. The level of testing required corresponds to the type of service performed.

NOTE Installation and preventive maintenance are not considered service events since the cardiograph is designed to be installed and maintained by the user. Service events are divided into two categories: repairs and upgrades. Repairs are then further divided into external repairs and internal repairs.

External Repairs

External repairs consist of the repair or replacement of one or more items when the repair or replacement does not require you to open the cardiograph case. Therefore, only a limited number of tests are necessary to verify performance after a repair. External repairs that involve the PIM and PIM lead set require an ECG simulation test to verify proper ECG signal path.

Typical external repairs include:

- PIM
- Patient leads
- Labels
- Battery
- Paper tray
- AC power cord
- Fuses
- PCMCIA card (For Trim II/III/Rx only)
- PCMCIA network LAN card (For Trim II/III/Rx only)

- Barcode reader (For Trim II/III/Rx only)
- Smart Card reader (For Trim II/III/Rx only)
- Magnetic card reader (For Trim II/III/Rx only)
- Modem card (For Trim II/III/Rx only)
- USB memory stick (For Trim II/III/Rx only)
- Shielded LAN cable
- Cart
- External cables

Refer to Table 6-1 for the required test blocks that must be performed after any external repair occurs.

Internal Repairs

If the case was opened, regardless of the repair, you must perform additional Performance Verification Tests. Refer to Table 6-1 for the required test blocks that must be performed after any internal repair.

Upgrades

Most PageWriter Trim upgrades are installed by the user and are not considered service events. The only exceptions are upgrades for the software and for the Magnetic Card Reader. Refer to Table 6-1 for the required test blocks that must performed after these upgrades.

Table 6-1 Tests Required

Service Event		**Test Blocks Required**
Repairs	External repairs not involving the patient module, such as battery, fuses, labels, cart, etc.	Perform Visual Inspection, Power On test, and functional tests specific to the components repaired.
	External repairs where the cardiograph case or PIM are not opened, but involving the patient module or patient lead set.	Perform Visual Inspection, Power On test, ECG simulation test, and functional tests specific to the components repaired.
Repairs	Internal repairs where the cardiograph case is opened.	Perform Visual Inspection, Power On test, ECG simulation test, safety tests S1, S2, or S3, plus functional tests specific to the components repaired.

Table 6-1 Tests Required *(continued)*

Service Event		Test Blocks Required
PIM Repair	Internal repairs where the PIM case is opened.	Perform Visual Inspection, Power On test, ECG simulation test, and safety test S3.
Upgrades	Software upgrades (via external PCMCIA slot)	Perform Power On test.
	Hardware upgrades	Perform Power On test, and functional tests specific to the components repaired.

Test and Inspection Matrix

The following Test and Inspection Matrix describes the various test blocks, expected test results, and what you need to document on the service record.

Test Block Name	Test or Inspection to Perform	Expected (Passing) Test Results	What to Record on a Service Record
Visual Inspection (V)	Perform visual inspection.	If there is no apparent wear, damage, or corrosion, the visual inspection passes.	V:P (pass) V:F (fail)
Power On (PO)	Power on the unit. Watch display for error codes. See “Troubleshooting” on page 5-1 for a list of codes.	If the display shows the PageWriter Trim software identification screen followed by the R/T ECG screen, the Power On test passes.	PO:P (pass) PO:F (fail)
ECG Simulation (ECG)	Connect a 12-lead patient simulator to the lead set and print a 12-lead ECG. Visually analyze the printout. See page 6-6.	If there is trace activity in all 12 leads with no notable distortion or noise, and cal pulses of proper duration and amplitude, then the ECG Simulation passes.	ECG:P (pass) ECG:F (fail)

Test Block Name	Test or Inspection to Perform	Expected (Passing) Test Results	What to Record on a Service Record
Safety (S1)	■ Earth leakage current NC (normal condition) ■ Earth leakage current SF (Single Fault) See page 6-7.	NC Maximum leakage current ≤ 300 uA (UL) ≤ 500 uA (IEC) x1 SF Maximum leakage current ≤ 1000 uA x2	Example: S1:P/100/200
Safety (S2)	Protective earth resistance See page 6-7.	Maximum impedance ≤ 200 milli Ω x1	Example: S2:P/100
Safety (S3)	Leads leakage current ■ Source (Normal condition) ■ Source (Single Fault condition) ■ With Mains on applied part (Single Fault Condition) See page 6-7.	≤ 10 uA x1 ≤ 50 uA x2 ≤ 50 uA x3	Example: S3:P/5/20/20

Test Equipment

The following test equipment is required to perform the complete set of Performance Verification tests:

- ECG Simulator
- Electrical Safety Tester
- Software Support Kit (CF Card with PCMCIA Adapter). Order part number 453563479701 through your Philips authorized service parts supplier.

Performance Verification Tests

Visual Inspection (V)

1. Before beginning the inspection, press the On/Standby button to put the cardiograph in Off mode, and unplug the power cord from the wall outlet.
2. Inspect the cardiograph external surfaces for the following:
   - Worn or damaged power cord
   - Loose or missing hardware

- Mechanical damage
- Evidence of liquid spill
- Worn printer drive gear
- Worn printer roller
- Corroded or damaged reusable electrodes, if present
- Damaged patient leads
- Dirt/paper residue on the thermal print head
- Frayed or damaged wiring
- Visible LCD display damage

3 Replace any damaged or missing items.

4 Clean the patient leads as necessary. See "Cleaning the PIM, Patient Data Cable, and Lead Wires" on page 3-2 for cleaning instructions.

Power On Test

To process a completed Power On test, you must restart the cardiograph.

To restart the cardiograph:

1 Press the On/Standby button for 2-3 seconds to shut down the cardiograph.

2 Press the On/Standby button again to power on the cardiograph.

3 If steps 1 and 2 do not work, press the Reset button (rear of cardiograph). To perform a soft reset, gently press the Reset button located next to the serial port on the back of the cardiograph. See Figure 6-1 and Figure 6-2.

After approximately 20 seconds, the PageWriter Trim II/III/Rx software identification screen appears, followed by an audible beep. For the PageWriter Trim I, the screen with five triangles appears.

Figure 6-1 Rebooting the Cardiograph (Trim II/III/Rx)

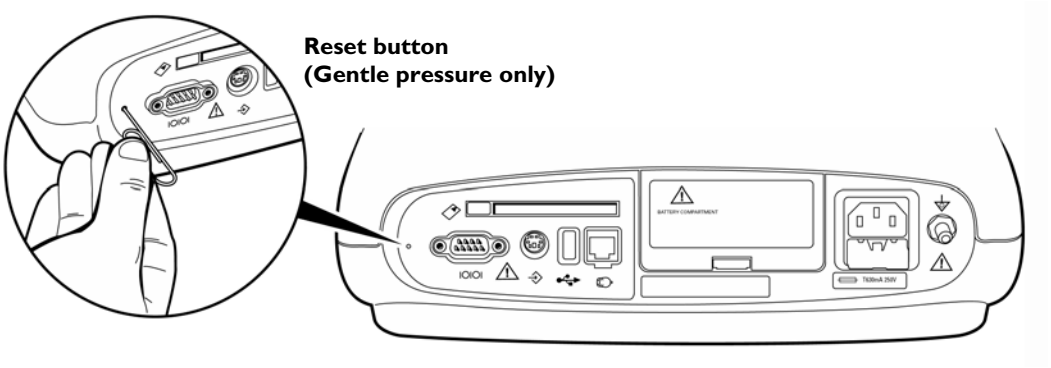
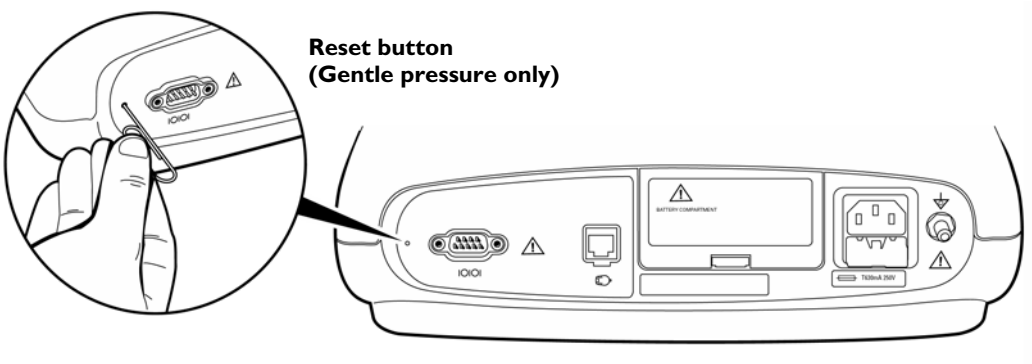


Figure 6-2 Rebooting the Cardiograph (Trim I)



The following self-tests are automatically performed during reboot:

- RAM
- Software CRC Test
- Flash Memory: onboard CompactFlash (CF)
- PIM Status
- Battery Voltage Test
- Printer Status

ECG Simulation (ECG)

Taking an ECG using a 12-lead ECG simulator allows you to verify areas of operation that the extended self-test cannot check:

- Integrity of the patient leads
- Accuracy of the paper speed (not available on all simulators)
- Accuracy of the gain settings (not available on all simulators)

Trace differences may result from difference in simulators, simulators settings, and from differences in configuration and control settings on the cardiograph.

To perform the ECG Simulation Test:

1. Connect the PIM lead wires to the simulator.
2. Verify that all lead wires are connected by observing the display for:
   - Flat lines or leads off information (for Trim II/III/Rx)
   - Leads off indicator (for Trim I)
3. Firmly pull each lead wire tight, and then look for excessive noise on the display (may be indicated by yellow or orange waveforms).
4. Press the **Auto** button to start an Auto 12-Lead recording.

   Depending on the cardiograph's configuration, the ECG may be printed automatically at this point, or it may only be previewed on the display.

5 If the ECG does not automatically print, press the *Enter* key ( ) to start printing.

Verify the following when printing is complete:

- Trace activity for all 12 leads. Confirms integrity for all patient electrodes and leadwires. Noise should measure less than one (1) mm, with no baseline wander.
- No gross distortion of complexes or calibration pulses (no overshoot, for example).
- Duration for calibration pulses for correct paper speed. With cardiograph set to record at 25 mm/sec, the calibration pulse should measure 5mm (calibration pulse duration is 200 ms).
- Calibration pulse amplitude is correct.

NOTES

- An arrhythmia simulator is not an acceptable tool for verifying computerized ECG analysis. The analysis software is biased to process human ECG data.
- Noise may be an artifact of poor connections to the simulator or position of the cables. If noise appears, check the connectors or adjust the cable drape.

Safety Tests

This section explains tests of the cardiograph and PIM electrical safety.

- Use the procedures called out by the manufacturer of the safety analyzer in use.
- Test both Normal and Reverse polarity line connections for each test, and record the worst-case value.
- If a ground reference point is needed for the testing, use the metal grounding stud on the back of the cardiograph.

Safety Test S1 - Earth Leakage

To check for leaks in the ground wire for the AC power cord.

- Normal Condition with both AC line connections intact:
  - $\leq$ 300 μA (UL, 120 VAC)
  - $\leq$ 500 μA (IEC, 240 VAC)
- Single Fault Condition with one AC line connection open:

  $\leq$ 1000 μ A

Safety Test S2 - Protective Earth Resistance

Impedance of protective earth ground:

$\leq$ 200 mΩ

Safety Test S3 - Leads Leakage Current

Leakage from Source or into Sink patient leads (Applied Parts). This test is also used for the Patient Interface Module (PIM).

- Source

- Normal Condition with both AC line connections and earth ground intact:
  ≤ 10 μA
- Single Fault Condition with separate open neutral and open earth, each in turn:
  ≤ 50 μA

- Sink

  Single Fault Condition with AC Mains voltage on Applied Parts (both AC line connections and earth ground intact).

  ≤50 μA

7

Removing and Replacing Cardiograph Components

This chapter contains information on removing and replacing the PageWriter Trim cardiograph battery, fuses, and paper tray. If you require further technical assistance, contact the nearest Philips Response Center. See “Contacting a Philips Response Center” on page 1-32.

About the Cardiograph Components

The cardiograph includes the following customer-installable components.

- Battery compartment
- AC fuses
- Paper tray

Removing and Replacing the Battery

All of the PageWriter Trim cardiograph models use the same single battery (part number 989803130051). Removal and replacement procedures are the same for all models.

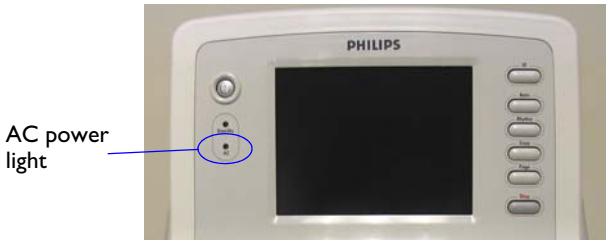
Removing the Battery

To remove the battery:

1 Unplug the AC power cord.

Make sure the green AC power indicator light is not illuminated.

Figure 7-1 AC power light



For an overview of cardiograph components, see “Tour of PageWriter Trim Cardiographs” on page 1-12.

2 Pull up on the battery door tab and remove the door.

Figure 7-2 Removing the battery door

3 Pull open the battery tab and pull out the battery.

Figure 7-3 Removing the battery

WARNING **Properly dispose or recycle any depleted batteries according to local regulations. Do not disassemble, puncture, or incinerate the batteries.**

Replacing the Battery

To replace the battery:

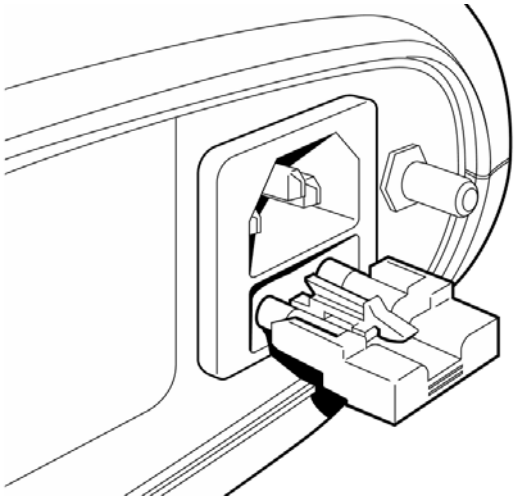
1. Insert the new battery into the battery slot, and push it in until it clicks into place.
2. Re-attach the battery door.

Removing and Replacing the AC Fuses

The AC fuse needs to be replaced when the cardiograph is plugged into AC power, but the green AC power indicator light on the front of the cardiograph does not illuminate.

Only use replacement AC fuses with Philips part number 453564000371 or use a 1.5 amp (250V) time-delay fuse the same size and configuration as the original fuse.

Figure 7-4 Replacing the AC Fuse



To replace the AC fuse:

1. Unplug the cardiograph from AC power. Pull out the AC power cord from the AC power connector on the rear of the cardiograph.
2. Locate the AC fuse, which is directly below the AC power connector.
3. Push down on the center tab on the fuse and pull out the fuse from the fuse holder slot.
4. Insert the new fuse using the same orientation, with the center tab facing up.
5. Push the fuse all the way into the fuse holder slot. The fuse snaps into place.

Removing and Replacing the Paper Tray

The paper tray is the same for all PageWriter Trim models.

Removing the Paper Tray

To remove the paper tray:

1. Pull out the paper tray until it stops.
2. Remove any unused paper.
3. Carefully lift tray, and pull it out completely.

Replacing the Paper Tray

To replace the paper tray:

1. Insert the paper tray into the opening.
2. Replace the paper (see page 3-3).
3. Close the paper tray.

8

Parts and Accessories

This chapter provides information on ordering replacement parts that are intended for installation by the customer, and other supplies, and accessories for the PageWriter Trim cardiographs. It shows illustrated, detailed views of each of the PageWriter Trim subassemblies, together with each element's part number to facilitate part ordering.

Ordering Replacement Parts

To order replacement parts, use prefix number 45.

In the US, call 877-447-7278

Outside the US, contact your local Philips Medical Systems Response Center. See "Contacting a Philips Response Center" on page 1-32.

Ordering Supplies and Accessories

To order medical supplies for the cardiograph, see "Supplies and Ordering Information" on page 1-20.

In the US, call 1-800-225-0230.

Outside the US, contact your local Philips Medical Systems Sales Office, or your authorized Philips Medical Systems Dealer or Distributor.

You can also visit our web site at: http://shop.medical.philips.com.

Patient Interface Module (PIM) Assembly and Parts

Figure 8-1 Patient Interface Module (PIM) Assembly Parts

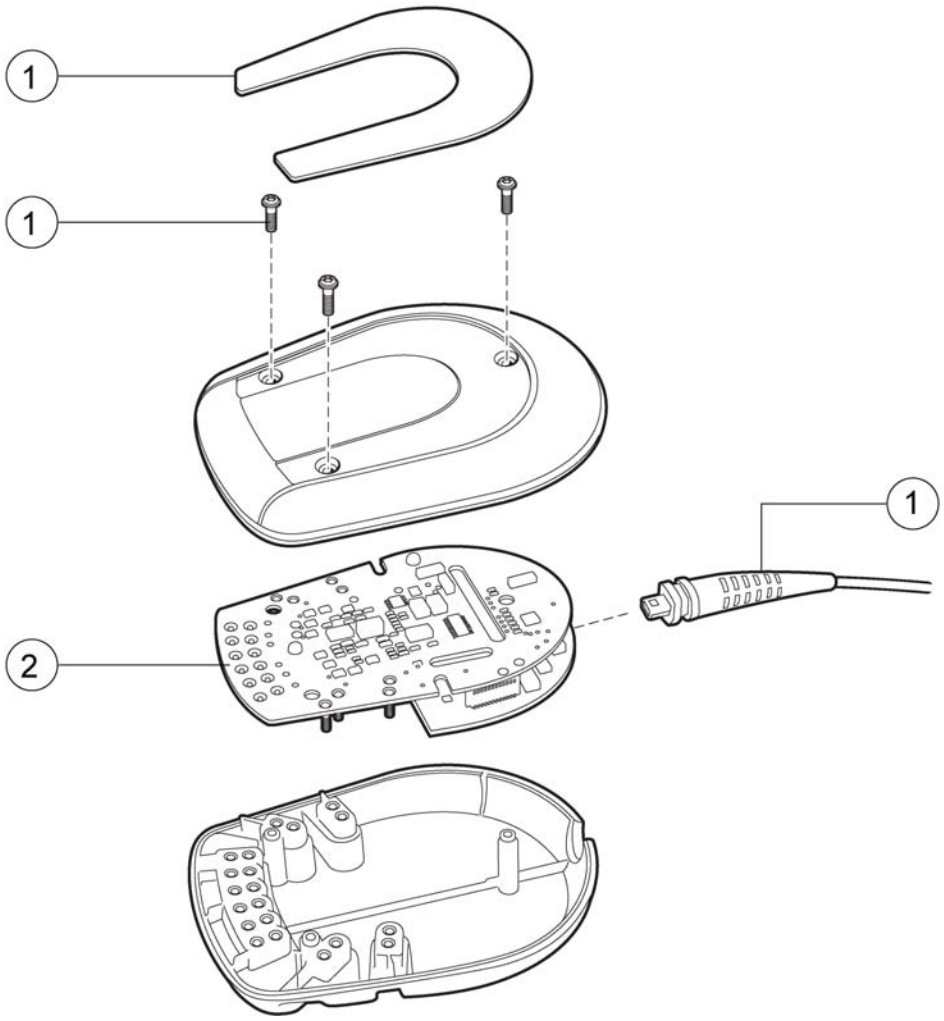


Table 8-1 Patient Interface Module (PIM) Assembly Parts

Reference Number	Description	Part Number
1	Patient Data Cable Replacement Kit	453564034571
2	Patient Interface Module (PIM) PCA Set	453564044081

Cart Assembly and Parts

Figure 8-2 Cart Assembly

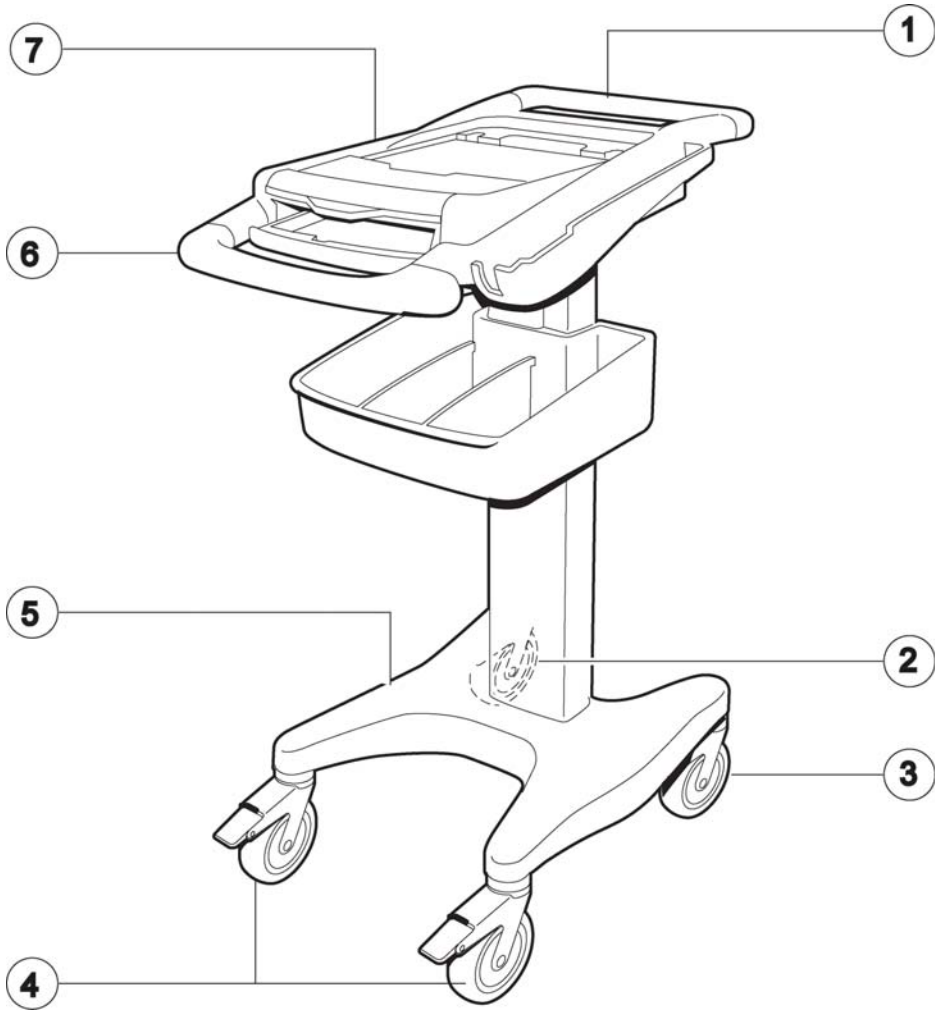


Table 8-2 Cart Assembly Parts List

Reference Number	Description	Part Number
1	Rear Handle Kit	453564054341
2	Swivel Caster Kit	453564050721
3	Locking Caster Kit	453564054301
4	Directional Locking Caster Kit	453564054291
5	Cart Base Kit (includes all four casters shown)	453564054311
6	Front Handle Kit	453564054331
7	Cart Upper Housing Kit	453564054321
Not shown	Complete Unassembled Replacement Cart	453564050691

A

Installing PageWriter Trim I Software

A software installation procedure takes approximately fifteen minutes to complete.

Software Upgrades

The upgrade path for a specific cardiograph is dependent upon the software version that is currently installed on the unit. Philips recommends that all cardiographs be upgraded to software version A.01.03 for optimal performance. See Table A-1 for more information on the appropriate upgrade path.

Table A-1 PageWriter Trim I Software Upgrade Path

Cardiograph Model	Available Software Revision	Lowest Software Version Required for Upgrade
Trim I	A.01.03 (*recommended*)	A.01.01
Trim I	A.01.01	A.00.02*

*. See "Upgrading Legacy Software" below for important information on upgrading from legacy software version A.00.02 to software version A.01.01 or higher. Philips recommends upgrading all PageWriter Trim I cardiographs to software version A.01.03 for optimal performance.

Upgrading Legacy Software

Legacy software is defined as any PageWriter Trim I software version that is lower than A.01.01. Upgrading legacy software to the Philips recommended software version A.01.03 requires performing two sequential software upgrades. First, upgrade the cardiograph software from A.00.02 to A.01.01, and then upgrade from software version A.01.01 to version A.01.03.

Special Note about Japanese Localization Option

The Japanese AR0 option for the PageWriter Trim I cardiograph is no longer available. The supported software revision level for all Japanese option cardiographs is legacy software version A.00.03. There is no software upgrade path for the Japanese localization option.

Software Revision Information

Table A-2 provides detailed software revision information.

Table A-2 Software Version Number Information

Component	A.00.02	A.00.03	A.01.00	A.01.01	A.01.03
Loader	L.03.12	L.03.12	L.03.12	L.03.12	L.03.12
Kernel	K.02.20	K.02.20	K.03.00	K.03.01	K.03.01
Application	A.07.02.01	A.07.02.02	A.08.00.02	A.08.01.01	A.08.03.01
PIM Loader	1.009	1.009	1.009	1.009	1.009
PIM Kernel	D.008	D.008	D.008	D.008	D.008 or G.003*

*. See "Software Version A.01.03 PIM Kernel Revision" on page A-13 for more information.

Follow the same procedure to upgrade the software in an existing working unit or to install software on a new system.

Obtaining Software

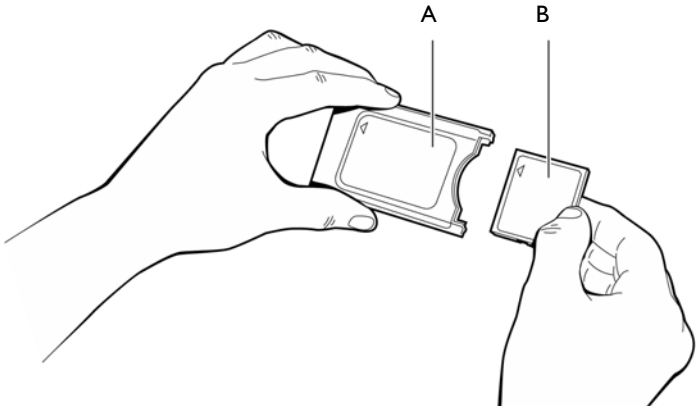
The software installation procedure requires the use of a computer with a compatible PCMCIA card slot, and internet access. The procedure also requires the use of a blank CompactFlash (CF) memory card and a PC card adapter. The memory card and adapter, referred to as a *PC card*, may be purchased from Philips using part number 453563479701. The following procedure describes how to download the cardiograph software files to the PC card. If the PC card with the applicable software is available, proceed to page A-5.

Downloading Software Files from Philips InCenter

All software upgrade files may be downloaded from the Philips InCenter web site found at: www.incenter.medical.philips.com. The InCenter site requires an active login and password. Instructions for obtaining a login and password are located on the right side of the main InCenter home page.

To load the software upgrade files to the PC card:

1 Insert the memory card into the PC card adapter as shown.



A PC card adapter **B** Memory card

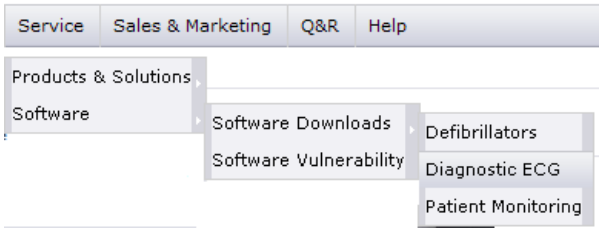
2 Insert the PC card into a compatible slot on a computer or other device.

3 Go to the InCenter site (**incenter.medical.philips.com**) and enter your login information.

NOTE For information on registering for the InCenter site, see "Using the Philips InCenter Site" on page 1-26.

4 On the top menu bar (top of screen), click on **Service**. From the drop-down menu, select **Software**, **Software Downloads**, and then **Diagnostic ECG**. The Diagnostic ECG Software Downloads screen appears.

Figure A-3 InCenter Service Menu



5 Select **PageWriter** from the side menu (left side of screen). Then select **PageWriter Trim I**. The PageWriter Trim I software download screen appears.

6 Click the **PageWriter Trim I A.01.01** or **A.01.03** link.

NOTE If upgrading a cardiograph from legacy software (A.00.03 or lower) to software version A.01.03, the cardiograph must first be upgraded to software version A.01.01. See "Upgrading Legacy Software" on page A-1 for more information.

7 On the following software download screen, click on the **PageWriter Trim A.01.03** or **A.01.01** link.

NOTE The **Documentation** link contains all user documentation (instructions for use, quick reference cards) for the selected software version.

8 The InCenter software download license agreement appears. If you agree to the terms of the agreement, click **I agree**.

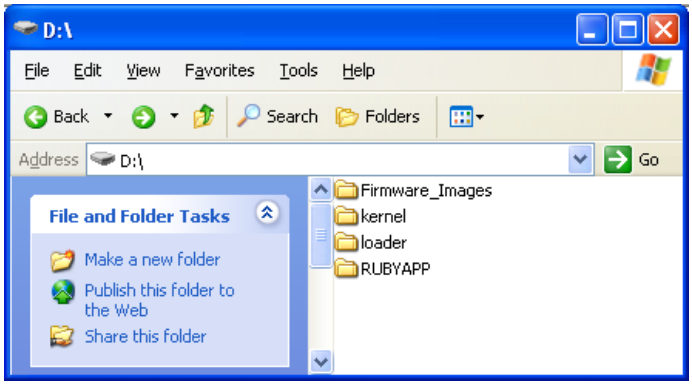
NOTE A message may appear that the **Download Manager** application needs to be installed. Click as indicated to install the ActiveX control in order to continue with the software download. See the InCenter main page for more information on installing and using ActiveX controls with the InCenter site.

9 Select a file destination and then click **Save**. The Philips Download Manager dialog appears. The software files are saved to the specified destination. After the files are saved, click **Launch**. The WinZip Self Extractor dialog appears.

10 Select a destination for the files and then click **Unzip**. The files are saved to the specified destination. If the save operation is successful, the top-level directory structure should appear as shown in Figure A-4.

NOTE The top-level directory structure is identical for software version A.01.01 and version A.01.03, and appears for both software versions as shown in Figure A-4.

Figure A-4 Trim I PC Card Directory



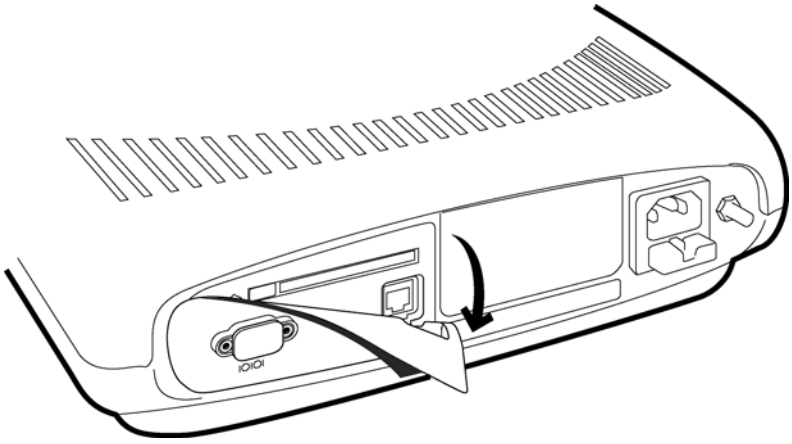
11 Remove the PC card from the computer or other device and proceed to the next section.

Installing the Software Upgrade

To install the software upgrade:

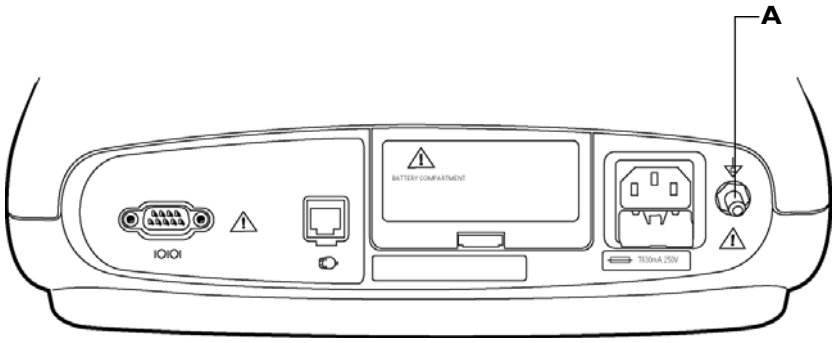
1 Peel off the protective covering from the rear panel of the cardiograph to expose the PC card slot.

Figure A-5 Removing the protective cover



2 To protect against static discharge, touch the PC card (with memory card inserted into the adapter) to the grounding post on the rear of the cardiograph.

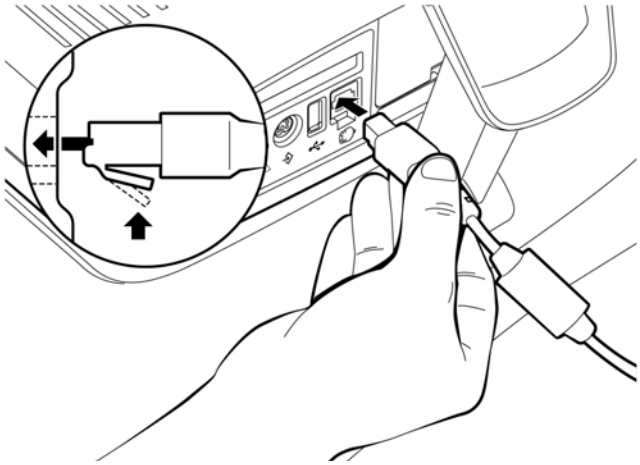
Figure A-6 Grounding post on rear of cardiograph



A Grounding post

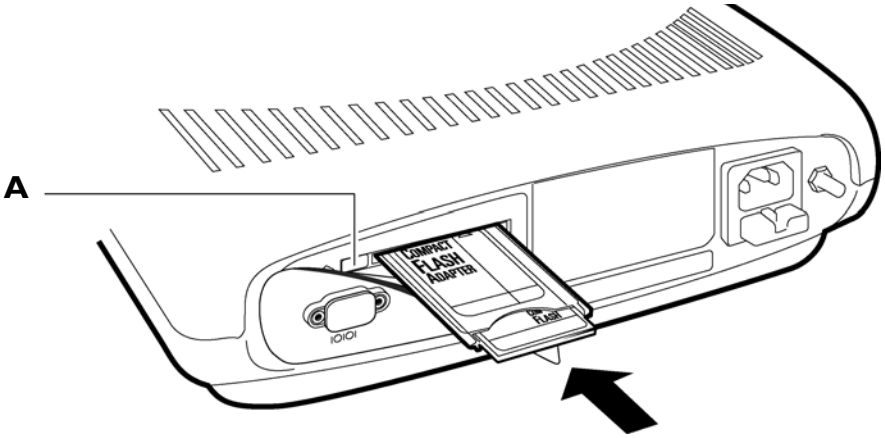
3 Ensure that the Patient Interface Module (PIM) is securely attached to the connector on the rear of the cardiograph.

Figure A-7 Connecting the PIM to the cardiograph



4 Insert the PC card into the PC card slot.

Figure A-8 Inserting the PC Card



A PC card eject button

5 Connect the cardiograph to AC power. Verify that the green LED on the front of the cardiograph is lit.

WARNING **Always connect the cardiograph to AC power when performing the software upgrade. If the cardiograph is not connected to AC power when performing the software upgrade it may be damaged.**

6 Press the On/Off button to turn on the cardiograph.

7 When the five triangles (◢◢◢◢◢) appear on the screen, press the **Patient ID** and **Auto** buttons at the same time. Press the buttons within two seconds of the triangles

appearing on the screen. If the buttons are not pressed in time, press the On/Off button to turn off the cardiograph. Press the On/Off button again and repeat the procedure.

8 A prompt appears to enter a password. Press the following keys in sequence: **Patient ID**, **Auto**, **Rhythm**, **Copy**, **Page**. Press the **Stop** key to delete your last input if it is wrong. The Biomed Service Program screen appears.

9 Turn the Trim Knob to highlight **Settings**, then press the Trim Knob to select it.

10 Ensure that the correct localization option is selected, see Table A-3, "Software Localization Options," on page A-7 for a complete listing of all available localization options.

Table A-3 Software Localization Options

Localization Option Code	Description	Language	Lead Standard	Paper Size
AB0	Chinese, Traditional	Traditional Chinese	AAMI	A
AB2	Chinese, Simplified	Simplified Chinese	IEC	A4
AB4	Singapore & Hong Kong English	English	AAMI	A
AB9	Portugal, Portuguese	Portuguese	IEC	A4
ABA	U.S.A./Canada English	English	AAMI	A
ABB	European English	English	IEC	A4
ABC	Canadian French	French	AAMI	A
ABD	European German	German	IEC	A4
ABE	European Spanish	Spanish	IEC	A4
ABF	European French	French	IEC	A4
ABG	Australian English	English	AAMI	A4
ABH	European Dutch	Dutch	IEC	A4
ABM	Latin American Spanish	Spanish	AAMI	A
ABN	Norway English	English	IEC	A4
ABS	Sweden English	English	IEC	A4

Table A-3 Software Localization Options *(continued)*

Localization Option Code	Description	Language	Lead Standard	Paper Size
ABU	United Kingdom English	English	IEC	A4
ABX	Finland English	English	IEC	A4
ABZ	European Italian	Italian	IEC	A4
AC4	Brazil Portuguese	Portuguese	AAMI	A
AC6	South Korea English	English	AAMI	A4
AC8	Argentina Spanish	Spanish	AAMI	A
ACB	Russia English	English	IEC	A4
ACE	European Denmark & Faroe Islands	English	IEC	A4
ACJ	India English	English	IEC	A4
AKB	English Czech Republic	English	IEC	A4
AKD	English Poland	English	IEC	A4
AKJ	Israel & Gaza Strip English	English	IEC	A4
AKR	English Slovak Republic	English	IEC	A4
AKV	Chile & Others Spanish	Spanish	AAMI	A
AR0	Japan Japanese Kanji	Japanese	IEC	A4
AR2	English Greece	English	IEC	A4
ARF	English Hungary	English	IEC	A4

11 Turn the Trim Knob to highlight the arrow icon, then press the Trim Knob to return to the main menu.

12 Turn the Trim Knob to highlight **Upgrade**, then press the Trim Knob to select it.

13 Turn the Trim Knob to highlight **Upgrade All** and then press the Trim Knob to select this installation option.

14 Turn the Trim Knob to highlight **Start**, then press the Trim Knob to select it. Information on the status of the upgrade installation appears on the screen.

15 When the installation is complete, the cardiograph automatically shuts down.

Remove the PC card from the cardiograph. Go to the next procedure to verify that the new software revision has been successfully installed.

Verifying the Software Installation

Complete the following procedure to verify that the software application has been successfully installed.

To verify the software installation is complete:

1 Ensure that the PC card is removed from the cardiograph.

2 Press the On/Off button to turn on the cardiograph.

3 When the five triangles (◢◢◢◢◢) appear on the screen press the **Patient ID** and **Auto** buttons at the same time.

4 Press the following buttons in sequence: **Patient ID**, **Auto**, **Rhythm**, **Copy**, **Page**. Press the **Stop** button to delete your last input if it is wrong. The Biomed Service Program screen appears.

5 On the Main Menu screen, turn the Trim Knob to highlight **Test**, then press the Trim Knob to select it.

6 Press the Trim Knob and then turn the Trim Knob to highlight **Self Test**. Press the Trim Knob to select it.

7 Turn the Trim Knob to highlight **Start**, then press the Trim Knob to select it.

8 Directions to complete the Self Test appear on the screen. When indicated, touch each button on the cardiograph except the On/Off button. The numbers 0-8 begin to appear on the screen. Continue the test by pushing the Trim Knob, then turn it clockwise once, and counterclockwise once to complete the test. The numbers 0-6 should appear on the screen when the test is complete. Press the **Patient ID** button if all 6 numbers appear on the screen.

9 Next, a series of characters appear on the screen. Verify that the characters appear correctly on the screen. Press the **Patient ID** button if the characters appear correctly on the screen.

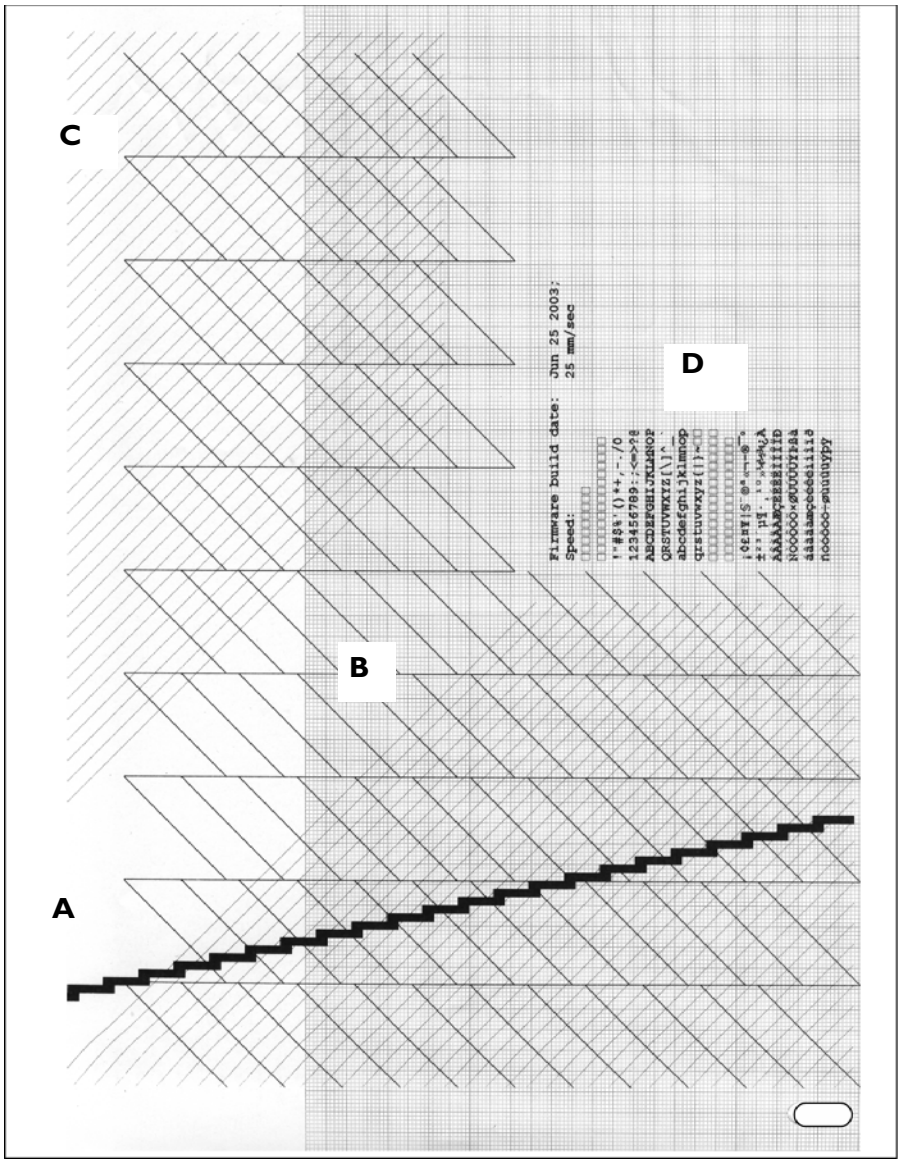
10 Next, the printer performs a self test and the cardiograph prints out the printer test page. Inspect the printer test page using the test points explained in Table A-3. If the printer test page matches the printer test points as described in Figure A-9 on page A-11 the

cardiograph has passed the printer test. If the printer test page does not match the printer test points, the cardiograph has failed the print test.

Table A-3 Printer Test Page Description

Test Point	Description
A	The stepped bars are sharp edged and printed cleanly without distortion or missing segments
B	The spacing between the vertical lines is 25 mm with a discrepancy of no more or less than 2%
C	The diagonal lines should be straight and printed cleanly without distortion or breaks in the lines
D	The character set is printed cleanly without distortion or missing characters, and all characters are clearly legible

Figure A-9 Printer Test Page

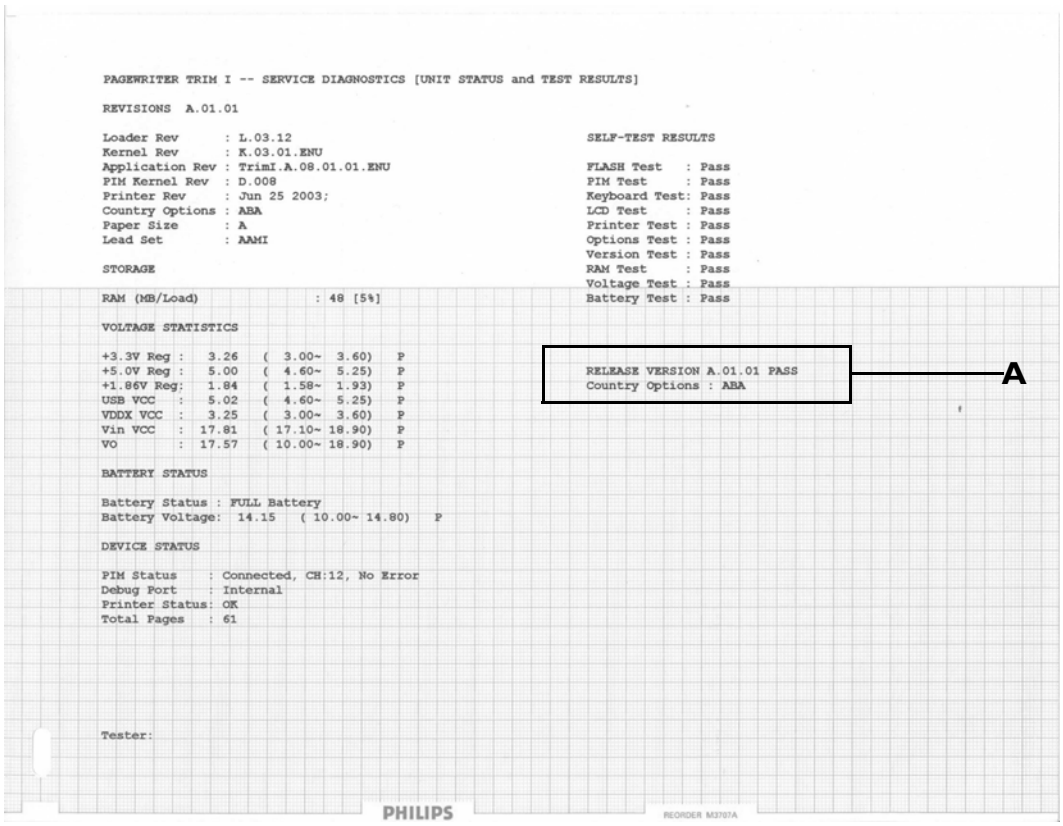


11 Press the **Patient ID** button if the cardiograph passed the printer test.

12 When the Self Test is complete, press the **Patient ID** button on the cardiograph to print out a report of the test results.

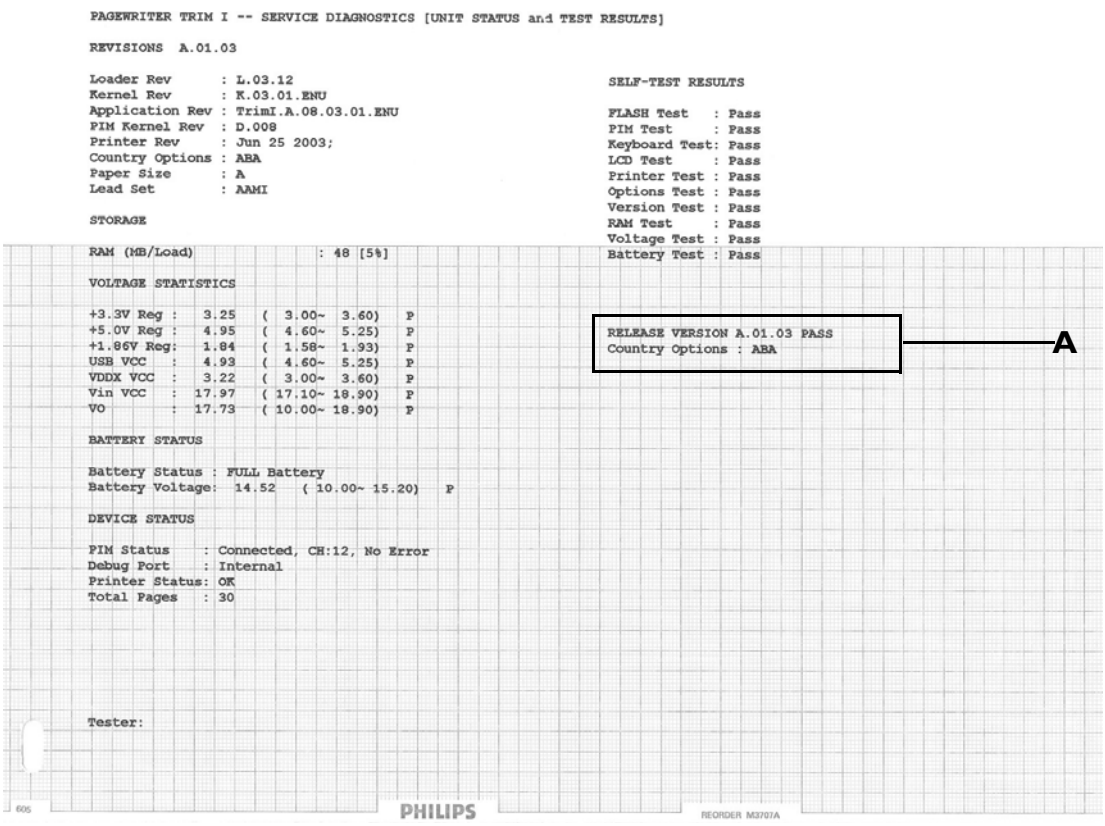
13 On the printed test report, check the software revision level next to **Release Version** (lower right side of report). The revision level should read **A.01.01**(Figure A-10 on page A-12) or **A.01.03** (Figure A-11 on page A-13). Check that the correct localization option appears next to **Country Options**, see Table A-3 on page A-7.

Figure A-10 Software Version A.01.01 Self Test Report


PAGEWRITER TRIM I -- SERVICE DIAGNOSTICS [UNIT STATUS and TEST RESULTS]
REVISIONS A.01.01
Loader Rev : L.03.12
Kernel Rev : K.03.01.ENU
Application Rev : TrimI.A.08.01.01.ENU
PIM Kernel Rev : D.008
Printer Rev : Jun 25 2003;
Country Options : ABA
Paper Size : A
Lead Set : AAMI
STORAGE
RAM (MB/Load) : 48 [5%]
VOLTAGE STATISTICS
+3.3V Reg : 3.26 (3.00~ 3.60) P
+5.0V Reg : 5.00 (4.60~ 5.25) P
+1.86V Reg: 1.84 (1.58~ 1.93) P
USB VCC : 5.02 (4.60~ 5.25) P
VDDX VCC : 3.25 (3.00~ 3.60) P
Vin VCC : 17.81 (17.10~ 18.90) P
VO : 17.57 (10.00~ 18.90) P
BATTERY STATUS
Battery Status : FULL Battery
Battery Voltage: 14.15 (10.00~ 14.80) P
DEVICE STATUS
PIM Status : Connected, CH:12, No Error
Debug Port : Internal
Printer Status: OK
Total Pages : 61
Tester:
SELF-TEST RESULTS
FLASH Test : Pass
PIM Test : Pass
Keyboard Test: Pass
LCD Test : Pass
Printer Test : Pass
Options Test : Pass
Version Test : Pass
RAM Test : Pass
Voltage Test : Pass
Battery Test : Pass
RELEASE VERSION A.01.01 PASS
Country Options : ABA
A
PHILIPS

A Release Version and Localization Option Information

Figure A-11 Software Version A.01.03 Self Test Report


PAGEWRITER TRIM I -- SERVICE DIAGNOSTICS [UNIT STATUS and TEST RESULTS]
REVISIONS A.01.03
Loader Rev : L.03.12
Kernel Rev : K.03.01.ENU
Application Rev : TrimI.A.08.03.01.ENU
PIM Kernel Rev : D.008
Printer Rev : Jun 25 2003;
Country Options : ABA
Paper Size : A
Lead Set : AAMI
STORAGE
RAM (MB/Load) : 48 [5%]
VOLTAGE STATISTICS
+3.3V Reg : 3.25 (3.00~ 3.60) P
+5.0V Reg : 4.95 (4.60~ 5.25) P
+1.86V Reg: 1.84 (1.58~ 1.93) P
USB VCC : 4.93 (4.60~ 5.25) P
VDDX VCC : 3.22 (3.00~ 3.60) P
Vin VCC : 17.97 (17.10~ 18.90) P
VO : 17.73 (10.00~ 18.90) P
BATTERY STATUS
Battery Status : FULL Battery
Battery Voltage: 14.52 (10.00~ 15.20) P
DEVICE STATUS
PIM Status : Connected, CH:12, No Error
Debug Port : Internal
Printer Status: OK
Total Pages : 30
SELF-TEST RESULTS
FLASH Test : Pass
PIM Test : Pass
Keyboard Test: Pass
LCD Test : Pass
Printer Test : Pass
Options Test : Pass
Version Test : Pass
RAM Test : Pass
Voltage Test : Pass
Battery Test : Pass
RELEASE VERSION A.01.03 PASS
Country Options : ABA
A
Tester:
PHILIPS

A Release Version and Localization Option Information

If an incorrect software revision level or incorrect localization option appears on the Self Test Report, reinstall the software following the same procedure. If an incorrect revision level or localization option appears again on the report, or if the cardiograph fails any portion of the Self Test, contact the nearest Philips Response Center for further assistance. See "Contacting a Philips Response Center" on page 1-32.

Software Version A.01.03 PIM Kernel Revision

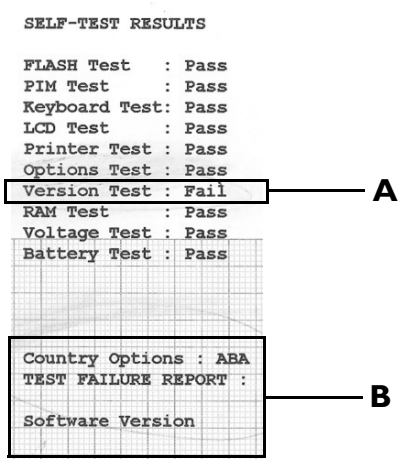
For software version A.01.03, the **PIM Kernel Revision Level** may appear on the Self Test Report as either **D.008** (as shown above in Figure A-11) or as version **G.003**. Both PIM Kernel versions are valid for software version A.01.03.

Special Note for Software Version A.01.01

The following section provides additional information about software version A.01.01.

Special Note about Software Version A.01.01 Self Test Report

Figure A-12 Software Version A.01.01 Self Test Report with Failed Version Test



A Failed Version Test Field

B Failed Self Test Information

If the cardiograph fails the Self Test, check the **Version Test** field under **Self-Test Results** (upper right side of report). If this is the only field that fails the Self Test, and the Self Test reports the failure as **Software Version** (shown as **B** in Figure A-12), confirm that software revision information is exactly the same as the information shown in Table A-4, "PageWriter Trim I Cardiograph A.01.01 Valid Software Revision Information," on page A-14. If the information on the Self Test and the information in Table A-4 are identical, the A.01.01 software installation is complete. If the information is not identical, reinstall the software and run the test again. For further assistance, contact the Philips Response Center, see page 1-32.

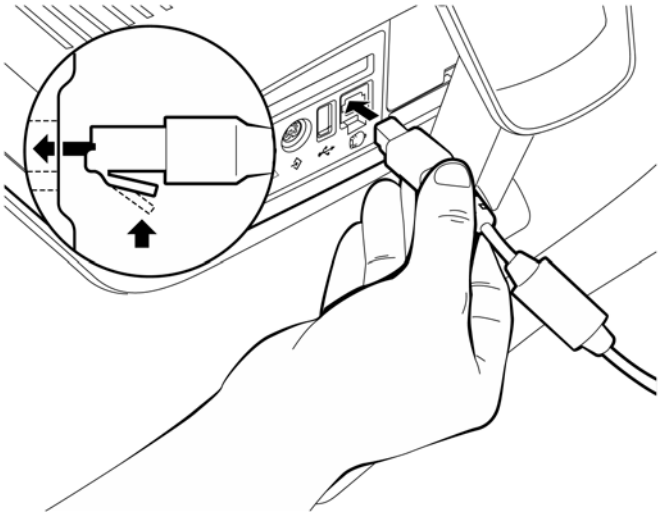
Table A-4 PageWriter Trim I Cardiograph A.01.01 Valid Software Revision Information

Software Element	Loader	Kernel	Application
PageWriter Trim I A.01.01 Software	L.03.12	K.03.01	A.08.01.01
PIM Software	1.009	D.008	Not applicable

Special Note for Software Version A.01.03

NOTE Always ensure that the Patient Interface Module (PIM) is connected to the cardiograph before pressing the On/Off button and returning the cardiograph to active use.

Figure A-13 Connecting the PIM to the cardiograph



Please note that the following sequence of events may occur if the PIM is not connected to the cardiograph, or a defective PIM is connected to the cardiograph when it is returned to active use with installed software version A.01.03.

To return the cardiograph to active use if the PIM is not connected or a defective PIM is connected:

1. If the Patient Interface Module (PIM) is not connected to the cardiograph or a defective PIM is connected, press the On/Off button.
2. Five squares (■■■■■) will appear at the upper left corner of the display.
3. The display will then go blank for approximately 50 seconds.
4. The error code **0207** will appear on the display.
5. Press any key other than the On/Off key to return the cardiograph to active ECG mode use.
6. Connect the PIM or replace the defective PIM.
7. The cardiograph will operate normally and requires no further intervention.

Special Note about PIM Repairs

If a Patient Interface Module (PIM) used with a PageWriter Trim I cardiograph with installed software version A.01.03 requires repair or replacement, ensure that following the repair or replacement that the cardiograph has installed PIM software version **G.003**. For further assistance, contact the nearest Philips Response Center. See "Contacting a Philips Response Center" on page 1-32.

B

Installing PageWriter Trim II, III, and Rx Software

A software installation procedure takes approximately twenty minutes to complete.

Software Upgrades

The upgrade path for a specific cardiograph is dependent upon the software version that is currently installed on the unit. Philips recommends that all cardiographs be upgraded to software version A.01.03 for optimal performance. See Table B-5 for more information for the appropriate upgrade path.

Table B-5 PageWriter Trim II/III/Rx Software Upgrade Path

Cardiograph Model	Available Software Revision	Lowest Software Version Required for Upgrade
Trim II/III/Rx	A.01.03 (*recommended*)	A.01.01
Trim II/III/Rx	A.01.01	A.00.02*

*. See "Upgrading Legacy Software" below for important information on upgrading from legacy software version A.00.02 to software version A.01.01 or higher. Philips recommends upgrading all PageWriter Trim II/III/Rx cardiographs to software version A.01.03 for optimal performance.

Upgrading Legacy Software

Legacy software is defined as any PageWriter Trim II/III/Rx software version that is lower than A.01.01. Upgrading legacy software to the Philips recommended software version A.01.03 requires performing two sequential software upgrades. First, upgrade the cardiograph software from A.00.02 to A.01.01, and then upgrade from software version A.01.01 to version A.01.03.

A token number and token label are required if upgrading from legacy software version A.00.03 to A.01.01 or higher. A token number is an identification number that is assigned to a specific cardiograph, and that is cross-referenced to the serial number of the same cardiograph. A token number is required in order to complete any legacy software upgrade. For information on obtaining a token number and token label in order to complete a legacy software upgrade procedure, contact the nearest Philips Response Center. See "Contacting a Philips Response Center" on page 1-32 for a listing of contact telephone numbers. For information on applying the token label to the cardiograph, or managing token numbers, see "PageWriter Trim II, III and Rx Token Label" on page 1-19.

Special Note about Japanese Localization Option

The Japanese AR0 option for the PageWriter Trim II and III model cardiographs is no longer available. The supported software revision level for all Japanese option cardiographs is legacy software version A.00.03. There is no software upgrade path for the Japanese localization option.

Table B-6 provides detailed software revision information.

Table B-6 Software Version Number Information

Component	A.00.03	A.01.00	A.01.01	A.01.03
Loader	L.03.12	L.03.12	L.03.12	L.03.12
Kernel	K.02.22	K.03.00	K.03.01	K.03.01
Application	A.07.02.02	A.08.00.02	A.08.01.01	A.08.03.02
PIM Loader	1.009	1.009	1.009	
PIM Kernel	D.008	D.008	D.008	G.003 or D.008*

*. See "Software Version A.01.03 PIM Kernel Revision" on page B-16 for more information.

Follow the same procedure to upgrade the software in an existing working unit or to install software on a new system.

Saving Custom Settings (Software version A.00.03 and lower only)

NOTE Software version A.01.01 and higher automatically saves custom settings. Only follow this procedure when upgrading from legacy software version A.00.03 and lower to software version A.01.01.

Custom settings (excluding all network settings) must be saved to a PC card before installing the software upgrade. All network settings must be recorded on these instructions in the spaces indicated before installing the software upgrade. Network settings must be manually reentered on the cardiograph after the software installation procedure is complete.

NOTE Ensure that all custom settings specified on the configuration screens are accurate and complete before saving the custom settings file.

To save custom settings:

1. Insert a PC card into the PC card slot on the rear of the cardiograph.
   Ensure that the PC card is fully inserted into the slot.

2. Press the *Tab* key ( ) or turn the Trim Knob to highlight the **Config** button on the Command Toolbar.
3. Press the space bar or the Trim Knob to select the button. The Configuration screens appear.

4 Press and hold the *Alt* key on the keyboard, and then press the *N* key to select the **Network** tab.

All configured cardiograph Network settings appear on the screen. Record all network settings as indicated in the following steps.

5 Under **Network ID** (right side of screen) write down the **Computer Name** exactly as it appears in the field.

NOTE The Computer Name is case-sensitive (upper and lower case letters) and is limited to 15 characters.

Computer Name	

6 Write down all of the networking information listed on the screen in the table below, if necessary.

Keep this information in a safe place. This information will be manually entered on the same screen after the software installation is complete.

NOTE All cardiograph networking configuration information is deleted when the software upgrade is installed. This information is not saved with the custom settings file.

IP Address	
Subnet Mask	
Default Gateway	
Secondary WINS Server	

7 Press and hold the *Alt* key on the keyboard and then press the *S* key to select the System tab.

8 Turn the Trim Knob to highlight the **Save Configuration File** button under **Configuration Management**, then push the Trim Knob to select the button.

The **Input Configuration file name** window appears.

9 Type in a name for the custom settings file.

Record the file name in the space below.

Custom Settings File Name	

10 Press the *Enter* key on the keyboard.

The Custom Settings file is saved to the PC card. A message appears that the file has been successfully saved.

11 Remove the PC card from the PC card slot.

Proceed to install the software upgrade.

Obtaining Software

The software installation procedure requires the use of a computer with a compatible PCMCIA card slot, and internet access. The procedure also requires the use of a blank CompactFlash (CF) memory card and a PC card adapter. The memory card and adapter, referred to as a *PC card*, may be purchased from Philips using part number 453563479701. The following procedure describes how to download the cardiograph software files to the PC card. If the PC card with the applicable software is available, proceed to page B-6.

Downloading Software Files from Philips InCenter Site

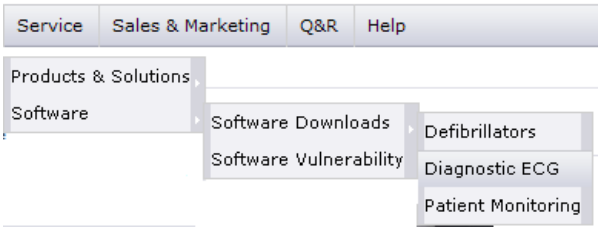
All software upgrade files may be downloaded from the Philips InCenter web site found at: www.incenter.medical.philips.com. The InCenter site requires an active login and password. Instructions for obtaining a login and password are located on the right side of the main InCenter home page.

NOTE For more information on registering for the InCenter site, see "Using the Philips InCenter Site" on page 1-26.

To load the software upgrade files to the PC card:

1. Insert the CompactFlash (CF) card into the PC card adapter.
2. Insert the PC card into the card reader on a computer or other device.
3. Go to the InCenter site (**incenter.medical.philips.com**) and enter your login information.
4. On the top menu bar (top of screen), click on **Service**. From the drop-down menu, select **Software**, **Software Downloads**, and then **Diagnostic ECG**. The Diagnostic ECG Software Downloads screen appears.

Figure B-14 InCenter Service Menu



5. Select **PageWriter** from the side menu (left side of screen). Then select the applicable cardiograph model (**II**, **III**, or **Rx**). The PageWriter Trim software download screen appears.
6. Click the **PageWriter Trim A.01.01** or **A.01.03** link.

NOTE If upgrading a cardiograph from legacy software (A.00.03 or lower) to software version A.01.03, the cardiograph must first be upgraded to software version A.01.01. See "Upgrading Legacy Software" on page B-1 for more information.

7. On the following software download screen, click on the applicable software version for your language.

NOTES The **US English and European** software link includes all supported European languages.

The **Documentation** link contains all user documentation (instructions for use, quick reference cards) for the selected software version.

8 The InCenter software download license agreement appears. If you agree to the terms of the agreement, click **I agree**.

NOTE A message may appear that the **Download Manager** application needs to be installed. Click as indicated to install the ActiveX control in order to continue with the software download. See the InCenter main page for more information on installing and using ActiveX controls with the InCenter site.

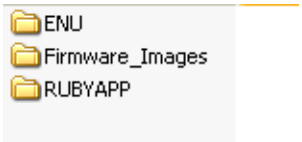
9 Select a file destination and then click **Save**. The Philips Download Manager dialog appears. The software files are saved to the specified destination. After the files are saved, click **Launch**. The WinZip Self Extractor dialog appears.

10 Select a destination for the files and then click **Unzip**. The files are saved to the specified destination. If the save operation is successful, the top-level directory structure should appear as shown in B-15.

NOTES The top-level directory structure is identical for software version A.01.01 and version A.01.03, and appears for both software versions as shown in Figure B-15.

The **ENU** folder will appear as **SCN** for Simplified Chinese, or **TCN** for Traditional Chinese.

Figure B-15 Trim II/III/Rx PC Card Directory



11 Ensure that the software files are saved to the PC card. Remove the PC card from the computer or other device and proceed to the next section.

Installing the Software Upgrade

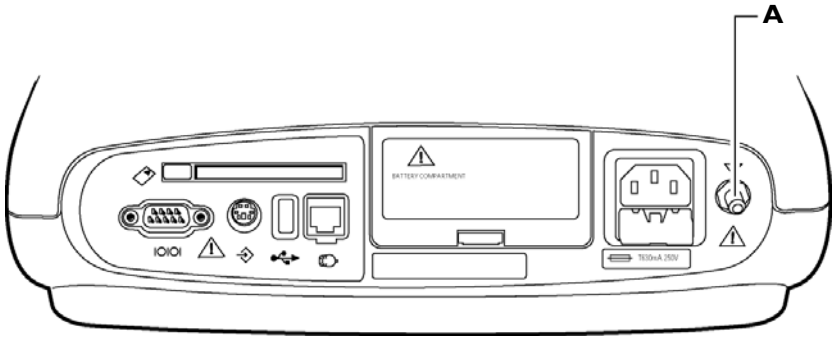
For ease of navigation on the installation screens, connect a USB mouse to the USB connector on the rear of the cardiograph. If a USB mouse is not available, use the *Tab* key and the *Enter* key on the keyboard to navigate on the software installation screens.

To install the software upgrade:

1 Connect a USB mouse to the USB connector ( ) on the rear of the cardiograph.

2 To protect against static discharge, touch the PC card (with memory card inserted into the adapter) to the grounding post on the rear of the cardiograph.

Figure B-16 Grounding post on rear of cardiograph

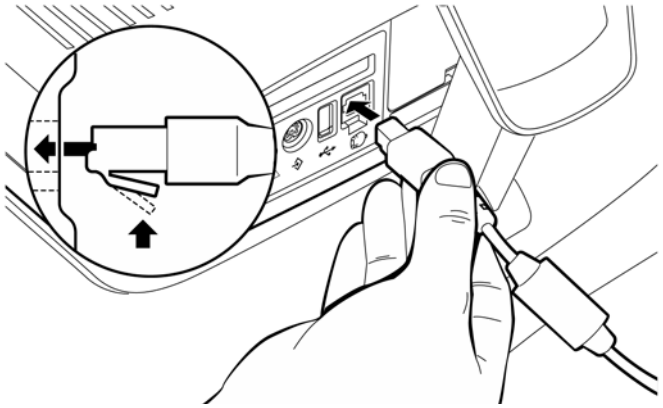


A Grounding post

3 Insert the PC card into the PC card slot on the rear of the cardiograph. Ensure that the PC card is fully inserted into the slot.

4 Ensure that the Patient Interface Module (PIM) is securely attached to the connector on the rear of the cardiograph.

Figure B-17 Connecting the PIM to the cardiograph



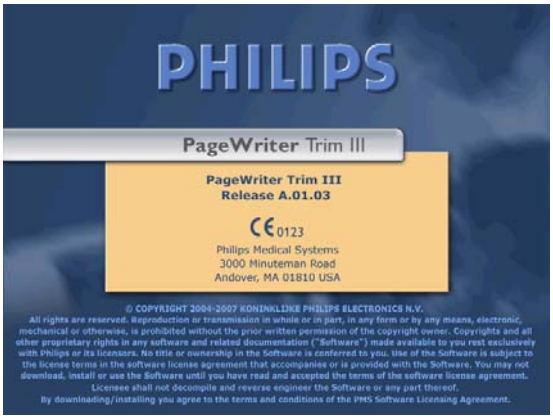
5 Connect the cardiograph to AC power. Ensure that the green AC power indicator light is lit.

WARNING **Always connect the cardiograph to AC power when performing the software upgrade. If the cardiograph is not connected to AC power when performing the software upgrade it may be damaged.**

6 Ensure that the cardiograph is shut down (screen is black) and that the Standby light is not lit. If necessary, press and hold the On/Standby button to exit Standby. Then, press and hold the On/Standby button to shut down the cardiograph.

7 Press the On/Standby button. After about twenty seconds, the cardiograph *beeps* and the PageWriter Trim software identification screen appears.

Figure B-18 The Software Identification Screen


PHILIPS
PageWriter Trim III
PageWriter Trim III
Release A.01.03
CE 0123
Philips Medical Systems
3000 Minuteman Road
Andover, MA 01810 USA
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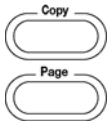
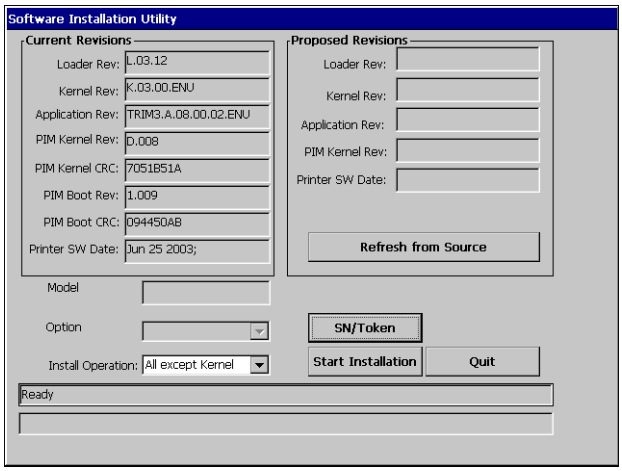


8 As soon as the software identification screen appears, press the **Copy** and **Page** buttons (right side of cardiograph) at the same time.

NOTE The software identification screen only appears for five seconds. If the software identification screen disappears before the buttons are pressed, press and hold the On/Standby button to shut down the cardiograph. Press the On/Standby button again and repeat the procedure.

9 The Software Installation Utility screen appears.

Figure B-19 Software Installation Utility screen



10 Ensure that the correct localization option is selected next to the **Option** field on the Software Installation Utility screen. See Table B-7, “Software Localization Options,” on page B-8 for a complete listing of all available localization options.

Table B-7 Software Localization Options

Localization Option Code	Description	Language	Lead Standard	Paper Size
AB0	Taiwan	Traditional Chinese	AAMI	A
AB2	China	Simplified Chinese	IEC	A4
AB4	Singapore & Hong Kong	English	AAMI	A4
AB9	Portugal	Portuguese (Brazilian)	IEC	A4
ABA	USA/Canada (English)	English	AAMI	A
ABB	European English	English	IEC	A4
ABB	Romania English	English	IEC	A4
ABC	Canada (French)	French	AAMI	A
ABD	Germany	German	IEC	A4
ABE	Spain	Spanish	IEC	A4
ABF	France	French	IEC	A4

Table B-7 Software Localization Options *(continued)*

Localization Option Code	Description	Language	Lead Standard	Paper Size
ABG	Australia	English	AAMI	A4
ABH	Netherlands	Dutch	IEC	A4
ABM	Latin American	Spanish	AAMI	A
ABN	Norway	Norwegian	IEC	A4
ABS	Sweden	Swedish	IEC	A4
ABU	UK	English	IEC	A4
ABX	Finland	Finnish	IEC	A4
ABZ	Italy	Italian	IEC	A4
AC4	Brazil	Portuguese	AAMI	A
AC6	South Korea	English	AAMI	A4
AC8	Argentina	Spanish	AAMI	A
ACB	Russia	English	IEC	A4
ACE	Denmark & Faroe Islands	Danish	IEC	A4
ACJ	India	English	IEC	A4
AKB	Czech Republic	English	IEC	A4
AKD	Poland	English	IEC	A4
AKJ	Israel & Gaza Strip	English	IEC	A4
AKR	Slovak Republic	English	IEC	A4
AKV	Chile & others	Spanish	AAMI	A
AR0*	Japan	Japanese	IEC	A4
AR2	Greece	English	IEC	A4
ARF	Hungary	English	IEC	A4

*. The Japanese AR0 option is no longer available. The supported software revision level for this localization option is A.00.03. There is no software upgrade path for this localization option.

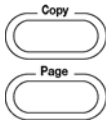
11 Press the *Tab* key to highlight the **Install Operation** drop-down menu or click on the menu with the mouse.

12 Press the *Tab* key to highlight the **Install Operations** menu, or click on the menu with the mouse.

13 ***For software version A.01.01 only:*** press the down arrow key to select **Kernel.**

CAUTION Do not select **Kernel** if installing software version A.01.03. Go to step 16.

14 Click on the **Start Installation** button or press *Tab* to highlight the button and then press the *Enter* key ( ). The kernel installation takes several minutes to complete, and the cardiograph automatically restarts.



15 After about forty seconds, the cardiograph *beeps* and the PageWriter Trim software identification screen appears.As soon as the software identification screen appears, press the **Copy** and **Page** buttons at the same time.

NOTE The software identification screen only appears for five seconds. If the software identification screen disappears before the buttons are pressed, press and hold the On/Standby button to shut down the cardiograph. Press the On/Standby button again and repeat the procedure.

The Software Installation Utility screen is displayed.

16 ***For all software versions:*** press the down arrow key to select **All Except Kernel.**

17 Click on the **Start Installation** button or press the *Tab* key to highlight the button then press *Enter*. It takes several minutes to upgrade the application, and then the cardiograph automatically shuts down. Remove the PC card from the cardiograph.

Go to the next procedure to verify that the software installation is complete.

Verifying the Software Upgrade

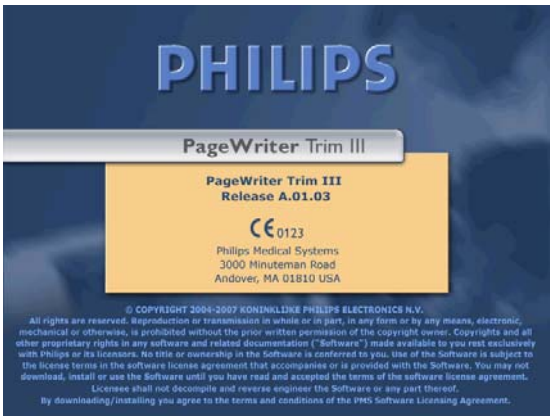
Complete the following procedure to verify that the software installation procedure on the PageWriter Trim II, III, or Rx model cardiographs is complete.

To verify that the software installation is complete:

1 Ensure that the installation PC card is removed from the cardiograph.

2 Press the On/Standby button. After about forty seconds, the cardiograph *beeps* and the PageWriter Trim software identification screen appears.

Figure B-20 The Software Identification Screen


PHILIPS
PageWriter Trim III
PageWriter Trim III
Release A.01.03
CE 0123
Philips Medical Systems
3000 Minuteman Road
Andover, MA 01810 USA
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By downloading/installing you agree to the terms and conditions of the PMS Software Licensing Agreement.

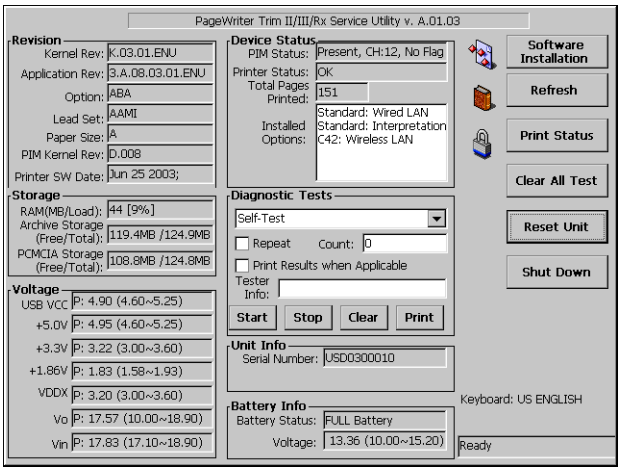
3 As soon as the software identification screen appears, press the left *Ctrl* + *Shift*+ Trim Knob at the same time.

4 The Access Code window appears. If it does not appear, press the left *Ctrl* + *Shift*+ Trim Knob sequence again.

5 Type in **1573** and then press the *Enter* key.

6 The Service Utility screen appears. Under **Diagnostic Tests** (center of screen) select **Self Test** from the menu. Ensure that the **Print Results When Applicable** check box is selected. Enter text in the **Test Info:** field to identify the specific test date or test operator.

Figure B-21 The Service Utility main screen



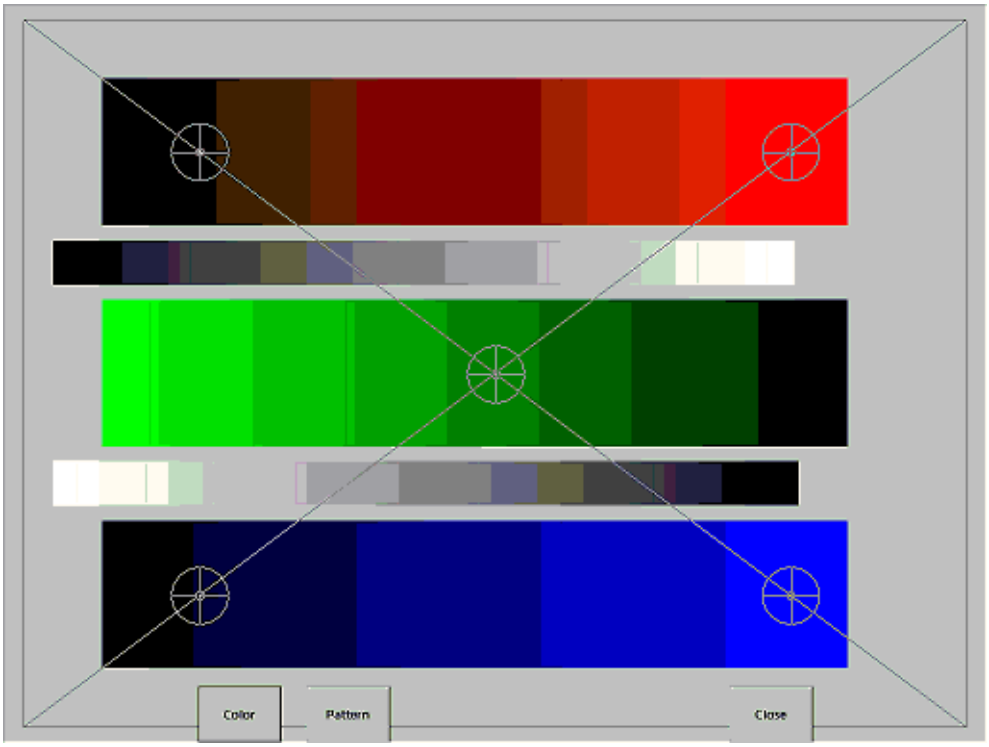
7 Click **Start**. A progress indicator appears at the lower right corner of the screen. Follow the instructions on the screen to complete each portion of the Self Test.

8 For the Trim Knob test, turn the Trim Knob in a clockwise direction for four full rotations, and then turn the Trim Knob in a counterclockwise direction for four full rotations. Press the Trim Knob. Verify that the Trim Knob graphic on the screen represents the actual position of the Trim Knob when turning. Click the **Pass** button if the graphic on the screen and the Trim Knob are consistent.

9 For the Screen Test, a blank screen appears with the buttons **Color** and **Pattern** at the bottom of the screen. Click both buttons to display the test image.

NOTE The color gradations in the image on the cardiograph display will be more gradual and smoother than those shown in Figure B-22.

Figure B-22 Screen Test Image



10 Look for the following details in the test image appearing on the screen:

– The progression of shading (from light to dark) in the red, green, and blue bars should be smooth and without breaks.

– The gray lines (on top of color bars) should be straight and intersect the cross hairs at five points on the screen.

If the screen does not look similar to the test image in Figure B-22, the screen display failed the Screen Test.

11 After examining the image, click the **Close** button.

The Test Result Confirmation window appears.

12 Select **Yes** if the image on the screen is displayed correctly.

Select **No** if the image on the screen did not display correctly.

A message appears confirming that the Screen Test failed or passed.

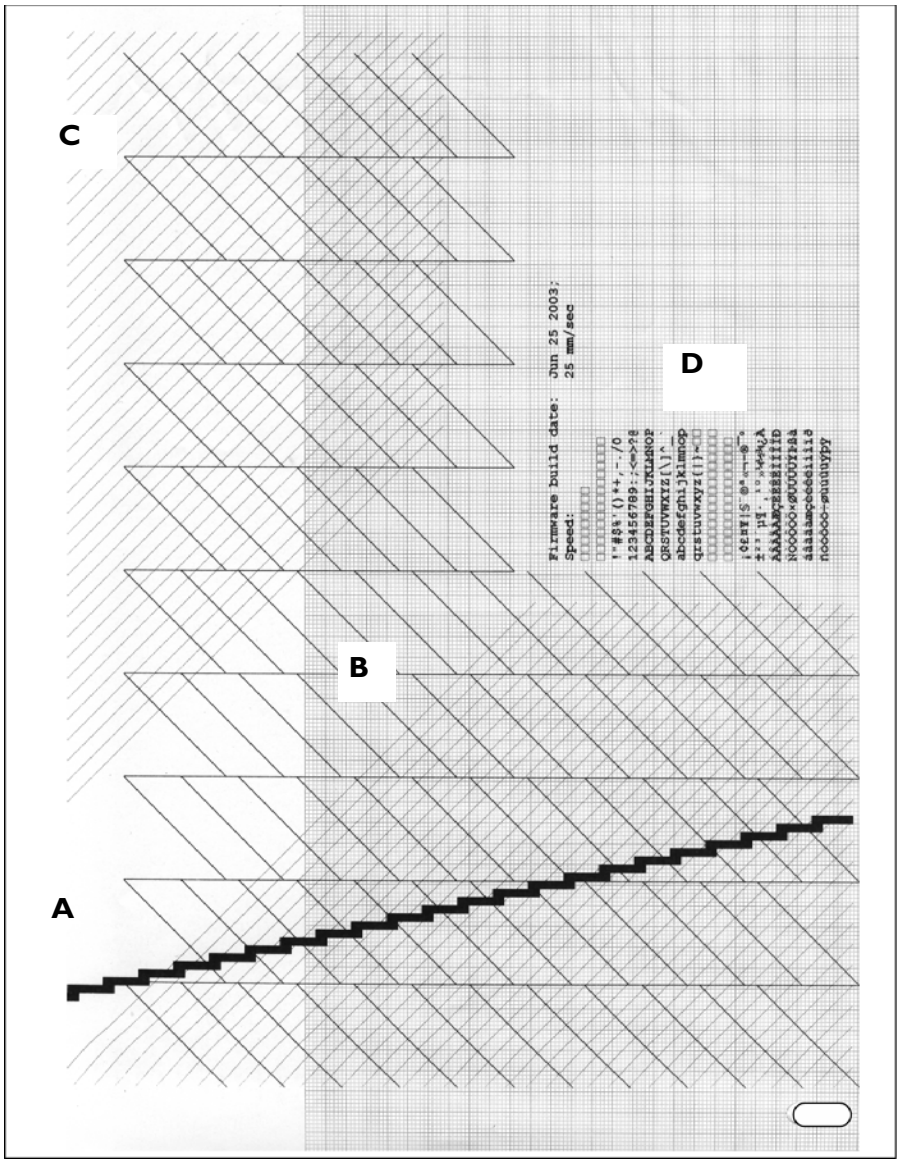
13 Next, the printer performs a self test and the cardiograph prints out the printer test page. Inspect the printer test page using the test points explained in Table B-4. If the printer test page matches the printer test points as described in Table B-4 the cardiograph has passed

the printer test. If the printer test page does not match the printer test points, the cardiograph has failed the print test.

Table B-4 Printer Test Page Description

Test Point	Description
A	The stepped bars are sharp edged and printed cleanly without distortion or missing segments
B	The spacing between the vertical lines is 25 mm with a discrepancy of no more or less than 2%
C	The diagonal lines should be straight and printed cleanly without distortion or breaks in the lines
D	The character set is printed cleanly without distortion or missing characters, and all characters are clearly legible

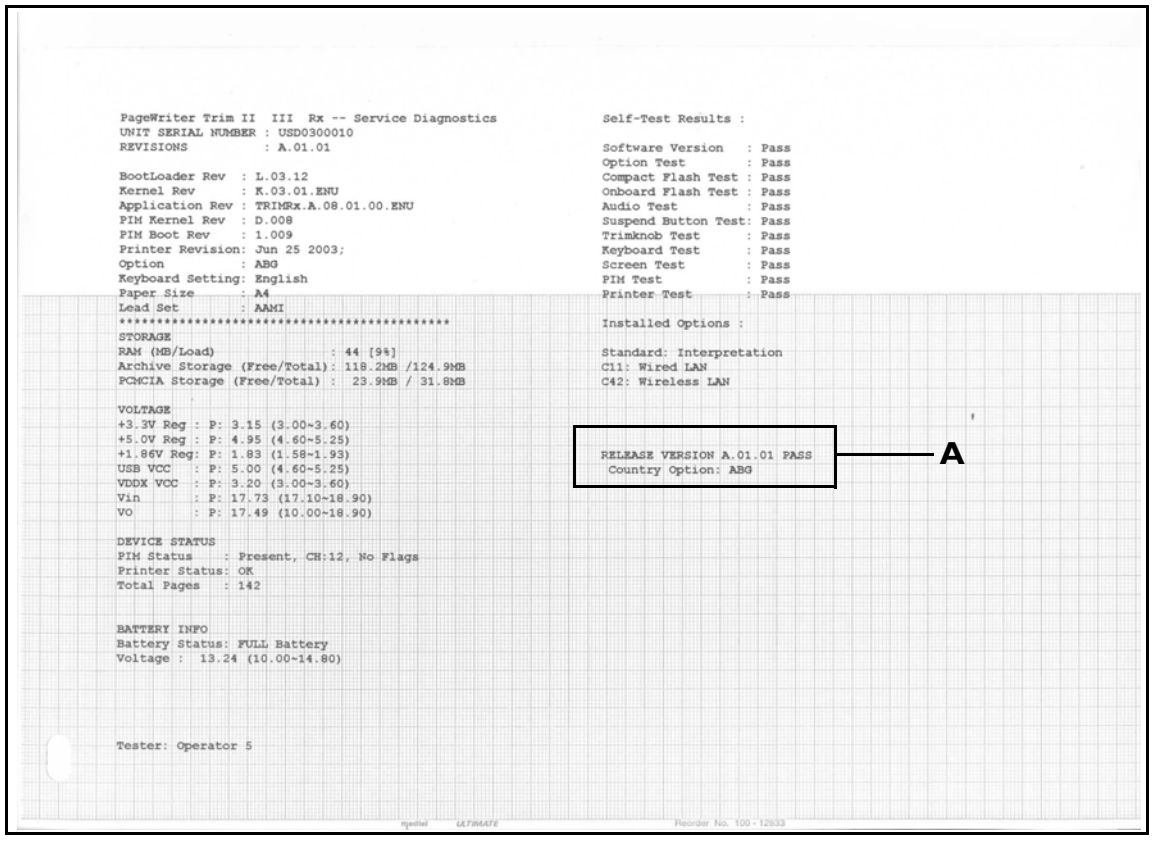
Figure B-23 Printer Test Page



14 Click the **OK** button if the cardiograph passed the printer test.

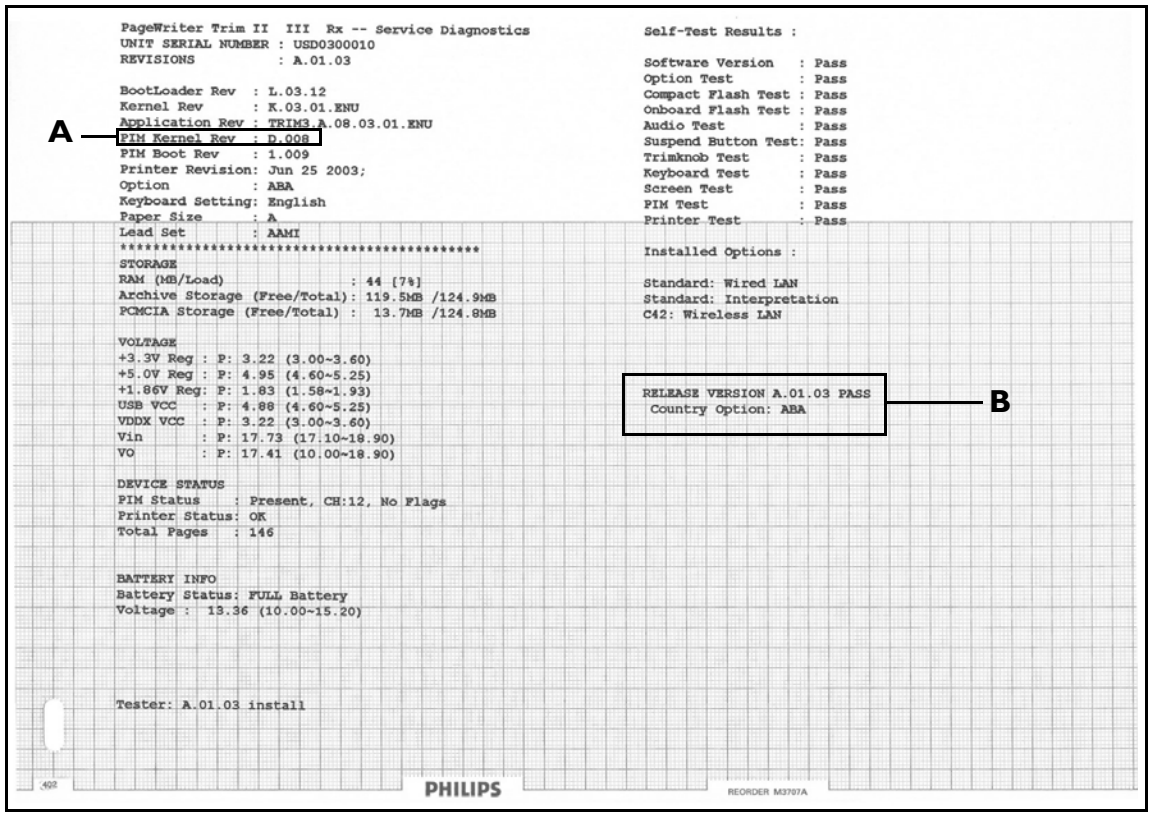
15 When the Self Test is complete, the cardiograph prints out a Self Test Report. On the printed test report, check the software revision level next to **Release Version** (lower right side of report). The revision level should read **A.01.01** (Figure B-24 on page B-15) or **A.01.03** (Figure B-25 on page B-16). Check that the correct localization option appears next to **Country Options**, see Table B-7 on page B-8.

Figure B-24 Software Version A.01.01 Self Test Report


PageWriter Trim II III Rx -- Service Diagnostics
UNIT SERIAL NUMBER : USD03000010
REVISIONS : A.01.01
BootLoader Rev : L.03.12
Kernel Rev : K.03.01.ENU
Application Rev : TRIMRx.A.08.01.00.ENU
PIM Kernel Rev : D.008
PIM Boot Rev : 1.009
Printer Revision: Jun 25 2003;
Option : ABG
Keyboard Setting: English
Paper Size : A4
Lead Set : AAMI
STORAGE
RAM (MB/Load) : 44 [9%]
Archive Storage (Free/Total): 118.2MB /124.9MB
PCMCIA Storage (Free/Total) : 23.9MB / 31.8MB
VOLTAGE
+3.3V Reg : P: 3.15 (3.00~3.60)
+5.0V Reg : P: 4.95 (4.60~5.25)
+1.86V Reg: P: 1.83 (1.58~1.93)
USB VCC : P: 5.00 (4.60~5.25)
VDDX VCC : P: 3.20 (3.00~3.60)
Vin : P: 17.73 (17.10~18.90)
VO : P: 17.49 (10.00~18.90)
DEVICE STATUS
PIM Status : Present, CH:12, No Flags
Printer Status: OK
Total Pages : 142
BATTERY INFO
Battery Status: FULL Battery
Voltage : 13.24 (10.00~14.80)
Tester: Operator 5
Self-Test Results :
Software Version : Pass
Option Test : Pass
Compact Flash Test : Pass
Onboard Flash Test : Pass
Audio Test : Pass
Suspend Button Test: Pass
Trimknob Test : Pass
Keyboard Test : Pass
Screen Test : Pass
PIM Test : Pass
Printer Test : Pass
Installed Options :
Standard: Interpretation
C11: Wired LAN
C42: Wireless LAN
RELEASE VERSION A.01.01 PASS
Country Option: ABG
A

A Software Revision Level and Localization Option Information

Figure B-25 Software Version A.01.03 Self Test Report



A PIM Kernel Revision Level Information

B Software Revision Level and Localization Option Information

If an incorrect software revision level or incorrect localization option appears on the Self Test Report, reinstall the software following the same procedure. If an incorrect revision level or localization option appears again on the report, or if the cardiograph fails any portion of the Self Test, contact the nearest Philips Response Center for further assistance. See "Contacting a Philips Response Center" on page 1-32.

Software Version A.01.03 PIM Kernel Revision

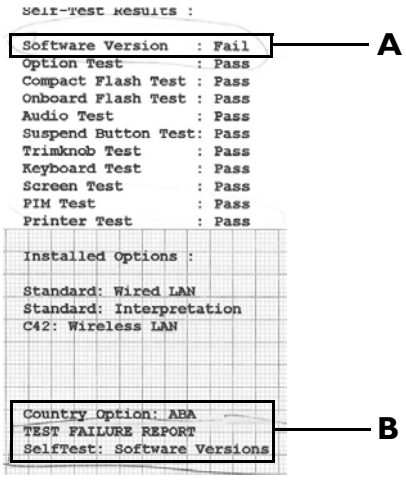
For software version A.01.03, the **PIM Kernel Revision Level** may appear on the Self Test Report as either **D.008** (as shown above in Figure B-25) or as version **G.003**. Both PIM Kernel versions are valid for software version A.01.03.

Special Note for Software Version A.01.01

The following section provides additional information about software version A.01.01.

Special Note about Software Version A.01.01 Self Test Report

Figure B-26 Self Test Report with Failed Software Version



A Failed Software Version Field

B Failed Self Test Information

If the cardiograph fails the Self Test, check the **Software Version** field under **Self-Test Results:** (upper right side of report). If this is the only field that fails the Self Test, and the Self Test reports the failure as **Software Versions** (shown as **B** in Figure B-26), confirm that software revision information is exactly the same as the information shown in Table B-8, "PageWriter Trim II/III/Rx Cardiograph A.01.01 Valid Software Revision Information," on page B-17. If the information on the Self Test and the information in Table B-8 are identical, the A.01.01 software installation is complete, and the cardiograph may be returned to active use. If the information is not identical, reinstall the software and run the test again.

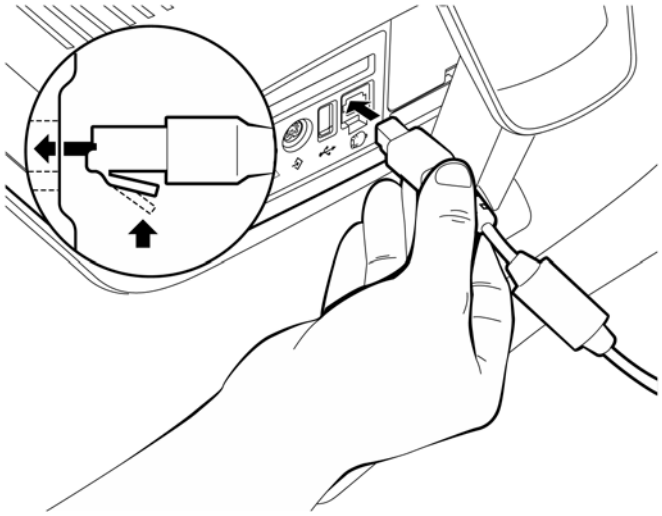
Table B-8 PageWriter Trim II/III/Rx Cardiograph A.01.01 Valid Software Revision Information

Software Element	Loader	Kernel	Application
PageWriter Trim II/III/Rx A.01.01 Software	L.03.12	K.03.01	A.08.01.01
PIM Software	1.009	D.008	Not applicable

Special Note for Software Version A.01.03

NOTE Always ensure that the Patient Interface Module (PIM) is connected to the cardiograph before pressing the On/Off button and returning the cardiograph to active use.

Figure 3 Connecting the PIM to the cardiograph



Please note that the following sequence of events may occur if the PIM is not connected to the cardiograph, or a defective PIM is connected to the cardiograph when it is returned to active use with installed software version A.01.03.

To return the cardiograph to active use if the PIM is not connected or a defective PIM is connected:

1. If the Patient Interface Module (PIM) is not connected to the cardiograph or a defective PIM is connected, press the On/Off button. The power up sequence can take up to 50 seconds to complete.
2. The message **PIM test results. Please check the patient interface module connection** will appear.
3. Turn the Trim Knob to highlight **OK** and then press the Trim Knob to select it. The cardiograph can be returned to active ECG mode use.
4. Connect the PIM or replace the defective PIM.
5. The cardiograph will operate normally and requires no further intervention.

Special Note about PIM Repairs

If a Patient Interface Module (PIM) used with a PageWriter Trim II/III/Rx cardiograph with installed software version A.01.03 requires repair or replacement, ensure that following the repair or replacement that the cardiograph has installed PIM software version **G.003**. For further assistance, contact the nearest Philips Response Center. See "Contacting a Philips Response Center" on page 1-32.

C

Wireless LAN Installation Instructions

Overview

The PageWriter Trim cardiograph supports the Cisco Aironet Wireless LAN card and is compatible with the 802.11b wireless standard. This Appendix describes how to install and configure the Cisco Aironet Wireless LAN card with the PageWriter Trim cardiograph running software version A.01.00 or higher. The Cisco Aironet Client Utility (ACU) driver is included in the PageWriter Trim cardiograph software. The wireless adapter may be configured to support the following security options.

Table C-1 PageWriter Trim Supported Security Options

PageWriter Trim Wireless Adapter Setting	Access Point Setting
No Security	No Security
Static WEP	WEP with Static Keys
LEAP	■ LEAP and WEP ■ LEAP and WEP with Per Packet Keying

For more detailed information on wireless security options and features, see the *Cisco Aironet Wireless LAN Client Adapters Installation and Configuration Guide for Windows CE* available for download from: www.cisco.com. For information on troubleshooting wireless connectivity on the cardiograph, see “Wireless Troubleshooting” on page 5-24.

The following topics are covered in these installation instructions.

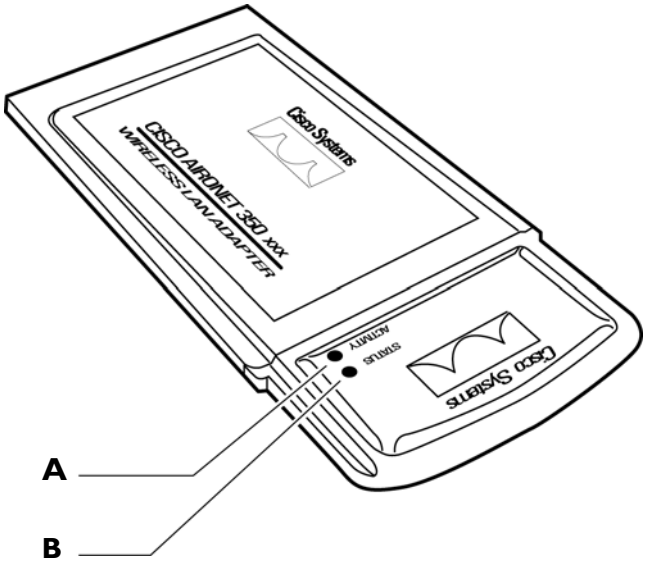
Topic	Page Number
Wireless LAN FAQs	page C-2
Installing the Wireless LAN Card	page C-3
Configuring a TraceMasterVue Remote Site	page C-10

Wireless LAN FAQs

Question	Answer
Does the cardiograph always need to be reset after making changes to the Aironet Client Utility?	Yes, the cardiograph must always be reset in order to permanently save changes to the Aironet Client Utility. If **No** is selected the changes will only be in effect until the next time that the cardiograph is reset.
Is WEP (Wired Equivalency Privacy) encryption supported?	Yes. Static WEP keys are supported at both the 40-bit and 128-bit encryption levels.
Is Dynamic WEP encryption supported?	No.
Is WPA (Wireless Protected Access) encryption supported?	No.
Is TKIP (Temporal Key Integrity Protocol) encryption supported?	No.
Is EAP (Extensible Authentication Protocol) with TLS (PEAP-Protected EAP) encryption supported?	No.
Is EAP-FAST encryption supported?	No.
Is there a limit to the number of wireless cardiographs which can be associated to an access point?	This is a function of the access point. Consult your network administrator.
Does the wireless card utilize DHSS (Direct Sequence Spread Sequence) or FHSS (Frequency Hopping Spread Sequence)?	Only DHSS is supported.
What is the expected transmission rate of the 11 Mbps?	It is 6 Mbps effective.

Installing the Wireless LAN Card

Figure C-1 The Wireless LAN Card

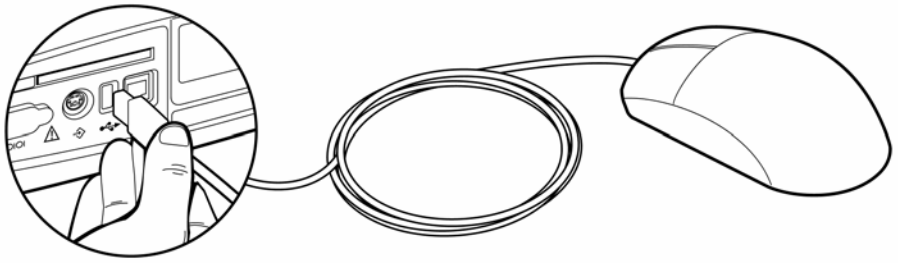


A Red Activity indicator
B Green Status indicator

For ease of navigation on the wireless LAN installation screens, connect a USB mouse to the USB port on the rear of the cardiograph.

To install and configure the wireless LAN card:

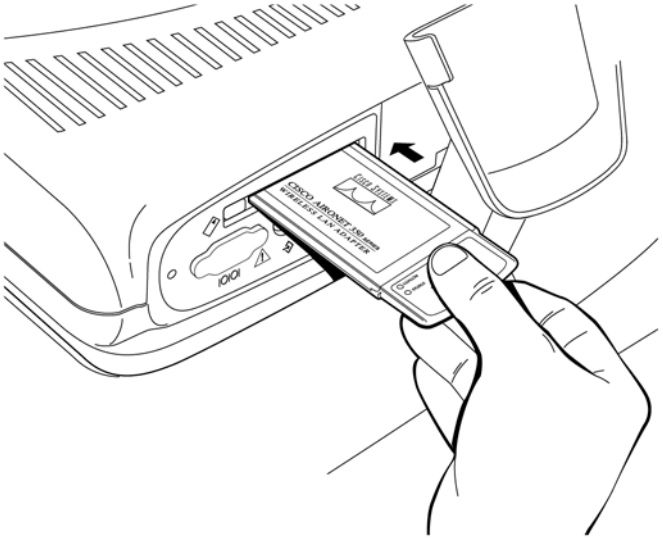
1 Insert the USB mouse into the USB connector port ( ) on the rear of the cardiograph.



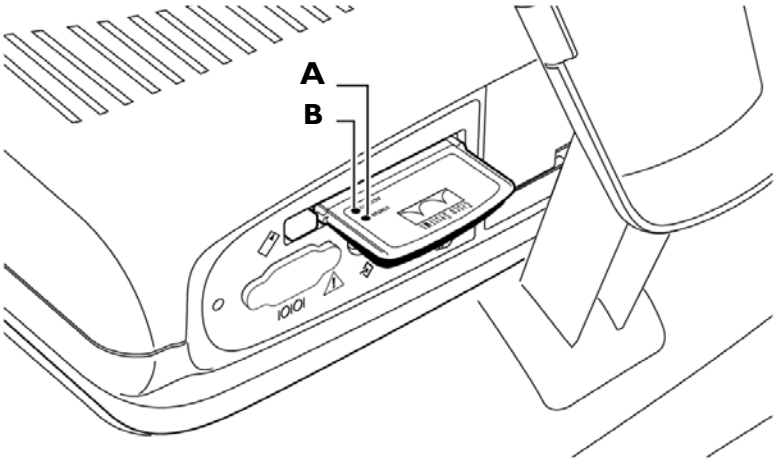
2 Ensure that the cardiograph is shut down (screen is black and Standby indicator light on front of cardiograph is not lit). If the cardiograph is in Standby, press the On/Standby button on the front of the cardiograph to return the cardiograph to active use. Press and hold the On/Standby button for three seconds, then release it to shut down the cardiograph.

3 Insert the wireless LAN card into the PC card slot on the rear of the cardiograph. Ensure that the card is fully inserted into the slot.

NOTE Only insert the wireless LAN card into the PC card slot when the cardiograph is shut down or the card will not be recognized by the cardiograph.



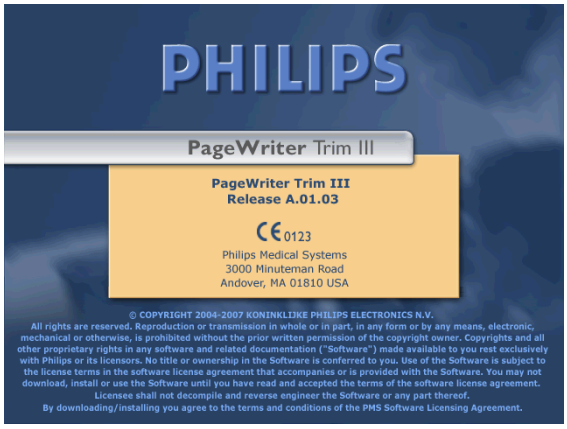
4 Press the On/Standby button. The green Status indicator on the front of the card illuminates when the card is properly inserted.



A Green Status indicator
B Red Activity indicator

5 When the software identification screen appears, press the *Ctrl* ( ) + *Shift* ( ) + 6 ( ) keys at the same time.

Figure C-2 PageWriter Trim Software Identification Screen


PHILIPS
PageWriter Trim III
PageWriter Trim III
Release A.01.03
CE 0123
Philips Medical Systems
3000 Minuteman Road
Andover, MA 01810 USA
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Licensee shall not decompile and reverse engineer the Software or any part thereof.
By downloading/installing you agree to the terms and conditions of the PMS Software Licensing Agreement.

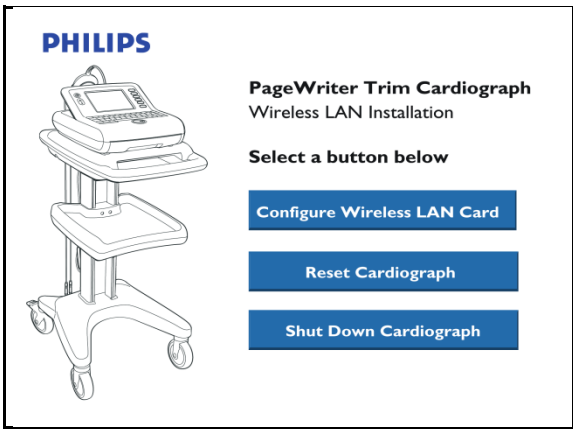
6 The Cisco License Agreement appears. Review the license agreement information. To agree to the terms of the license agreement, click on **I agree to all terms of this agreement**.

7 Click the **OK** button.

8 The PageWriter Trim Wireless LAN Installation screen appears. Click the **Configure Wireless LAN Card** button.

NOTE This button will not be enabled if the Cisco License Agreement is not accepted.

Figure C-3 PageWriter Trim Wireless LAN Installation screen



9 The Aironet Client Utility window appears. The **Profiles** tab is selected. Click on the **Edit...** button.

10 The Profile Properties window appears. Specify the wireless network settings applicable for your facility. Table C-2 describes the available settings.

Table C-2 Wireless LAN Card Settings

Setting	Description	Philips Recommended Default Setting
SSID	The Service Set Identifier	Consult your network administrator for more information on this setting. Note: If the SSID field is left blank, the cardiograph can associate with any access point on the network that is configured to accept broadcast SSIDs.
Client Name	Defining a name for the specific cardiograph enables an administrator to determine what devices are connected to the network. The client name is limited to 16 characters in length.	Consult your network administrator for more information on this setting.
Infrastructure Mode	This setting specifies the type of network in which the cardiograph is being installed.	**Yes** Note: The PageWriter Trim cardiograph does not support *ad hoc* or peer-to-peer communication.
Power Save Mode	This setting defines the power consumption level for the wireless adapter.	**Fast PSP** (Power Save Mode) Notes: *Fast PSP* is a power saving mode that automatically adjusts battery consumption based upon the amount of network traffic. For example, during periods of low network activity, less power is consumed. *CAM* (Constantly Awake Mode) is not recommended for use due to high power consumption. The *Max PSP* (Max Power Savings) setting is not recommended due to the low level of data throughput. For more information see the *Cisco Aironet Wireless LAN Client Adapters Installation and Configuration Guide for Windows CE*.

Table C-2 Wireless LAN Card Settings *(continued)*

Setting	Description	Philips Recommended Default Setting
Network Security Type	This setting specifies the type of 802.11b authentication that the wireless adapter will use.	**None** or **LEAP** Consult your network administrator for more information on this setting. Note: The PageWriter Trim cardiograph does not support EAP-FAST authentication.
WEP	This setting specifies the type of Wired Equivalency Privacy (WEP) that the wireless adapter will use.	**None** or **Static WEP** Consult your network administrator for more information on this setting. Note: the wireless adapter allows up to four static WEP keys with 40-bit or 128-bit encryption. The PageWriter Trim cardiograph does not support dynamic WEP keys. Note: The index of the WEP transmit key must match the index of the client adapter. For example, the first WEP key on the access point must match the first key on the wireless adapter.
Authentication Type	This setting defines how the wireless adapter will attempt to authenticate to an access point.	**Open**
User Name	This setting is only used with LEAP.	Consult your network administrator for more information on this setting.
User Password	This setting is only used with LEAP.	Consult your network administrator for more information on this setting.
User Domain	This setting is only used with LEAP.	Consult your network administrator for more information on this setting.
Mixed Mode	This setting indicates if the wireless adapter can associate to an access point that allows both WEP and non-WEP associations.	Consult your network administrator for more information on this setting.
PAC Provisioning Mode	This setting is only used with EAP-FAST and is not supported on the PageWriter Trim cardiograph.	

Table C-2 Wireless LAN Card Settings *(continued)*

Setting	Description	Philips Recommended Default Setting
PAC Authority	This setting is only used with EAP-FAST and is not supported on the PageWriter Trim cardiograph.	
World Mode	This setting allows the wireless adapter to automatically adjust to the maximum power level and frequency range of access points in different regions of the world.	**Disabled** Note: For more information on this setting, see the *Cisco Aironet Wireless LAN Client Adapters Installation and Configuration Guide for Windows CE*.
Data Rate	This setting specifies the rate at which the wireless adapter should transmit or receive packets to or from the access point.	**Auto**
Transmit Power	This setting defines the power level at which the wireless adapter transmits to the access point.	**Max**
Offline Channel Scan	This setting enables the wireless adapter to periodically scan for a better access point with the same SSID if the signal strength falls below 50%.	**Enabled**

11 After making all selections, click the **OK** button. The Aironet Client Utility main screen appears. The **Profile** tab is selected. The configured settings are automatically saved to a profile. Rename the profile, if necessary. This profile is automatically selected as the active profile in the **Select Active Profile** drop-down list.

12 Click on the **Status** or the **Survey** tab to view information about the wireless LAN card signal quality and signal strength, and if the wireless LAN card has successfully associated to the access point.

NOTES

Select the **Survey** tab, then click the **Setup** button to view the Destination MAC address information.

If LEAP credentials (user name, user password, user domain) are required in order to associate with an access point, follow the procedure "Enabling LEAP Credentials" on page C-10.

13 Click the **OK** button (upper right corner of screen) to close the Aironet Client Utility. The PageWriter Trim Wireless LAN Installation screen appears. Click the **Reset Cardiograph** button. The cardiograph automatically restarts.

14 When the R/T (real-time) ECG screen appears, press the *Tab* key ( ) to highlight the **Config** button on the Command Toolbar. Press the space bar to select the button. The Configuration screens appear.

15 Press and hold the *Alt* key and then press the *N* key to select the **Network** tab. On the Network Configuration screen, press the *Alt* key and then press the *E* key to select the **Wireless Network** tab.

16 Select **Obtain IP Address Automatically** or **Specify IP Address** and enter all relevant information. Consult your network administrator for more information on configuring IP address settings.

17 Press the *Enter* key when done. The Configuration Management window appears. Press the *Enter* key to select the **Yes** button and to save the settings. Select **No** to close the window and return to the Wireless LAN Network screen.

18 The R/T ECG screen appears. Press the On/Standby button for three seconds, then release it to shut down the cardiograph. Press the On/Standby button again to restart the cardiograph. The new network setting are applied.

To configure a TraceMasterVue Remote Site for the purpose of transmitting ECGs, see “Configuring a TraceMasterVue Remote Site” on page C-10.

For information on the Status indicators on the wireless adapter, see Table C-3 below.

Table C-3 Wireless Adapter LED Indicators

Green LED Status	Amber LED Status	What LEDs indicate
Blinking quickly (every 0.5 seconds)	Blinking quickly	Wireless adapter is not associated to an access point.
Off	Blinking quickly	Wireless adapter is associated to an access point (with Power Save Mode set to default Fast PSP)
Off	Off	Wireless adapter is not receiving power, or an error has occurred.
Blinking slowly (every 1.5 seconds)	Blinking quickly	Wireless adapter is associated to an access point (with Power Save Mode set to CAM; not recommended due to increased power consumption).

Enabling LEAP Credentials

Follow this procedure after entering the user name, user password, and user domain settings used with LEAP in the Aironet Client Utility (ACU). For information on entering settings in the ACU, see “Installing the Wireless LAN Card” on page C-3. The following procedure must be completed in order to enable LEAP credentials used with LEAP authentication. This procedure must be completed when:

- transmitting ECGs from the Archive for the first time
- the wireless LAN card is inserted or removed from the cardiograph while the cardiograph is in active use (not in Standby)
- the cardiograph is returned to active use after a full power shut down, and the wireless LAN card is fully inserted into the PC card slot on the rear of the cardiograph when the cardiograph is restarted

To enable LEAP credentials:

1 After specifying LEAP settings in the Aironet Client Utility (ACU), restart the cardiograph.

2 When the R/T (real-time) ECG screen appears, press the *Tab* key ( ) to highlight the **Archive** button on the Command Toolbar. Press the space bar to select the button. The Archive screen appears.

3 Press the *Tab* key to highlight the **Login WLAN** button (bottom left corner of screen). Press the space bar to select the button.

NOTE No information is entered. LEAP credentials are enabled by merely selecting the **Login WLAN** button.

4 Press the *Esc* key ( ) to exit the Archive screen.

5 Press the *Tab* key ( ) to highlight the **Config** button on the Command Toolbar. Press the space bar to select the button. The Configuration screens appear.

6 Press and hold the *Alt* key and then press the *S* key to select the **System** tab. On the System screen, under **Diagnostics** (right side of screen) press the *Tab* key to highlight the **Network** button. Press the space bar to select the button. The Network connection window appears. The networking information for the cardiograph appears.

To configure a TraceMasterVue Remote Site for the purpose of transmitting ECGs, see “Configuring a TraceMasterVue Remote Site” on page C-10.

Configuring a TraceMasterVue Remote Site

The Remote Site settings on the cardiograph are used to define specific TraceMasterVue ECG Management Systems that receive ECGs from the PageWriter Trim cardiograph.

For more comprehensive information on configuring the PageWriter Trim cardiograph with a TraceMasterVue ECG Management System, see the *Installing TraceMasterVue and Configuring Communication Guide* available for download from the Philips InCenter web site (incenter.medical.philips.com). Registration is required to access materials on the site. For

information on registering to use the InCenter site, see “Using the Philips InCenter Site” on page 1-26. The guide is updated on a regular basis, check for updates at the Philips InCenter web site.

To configure a Remote Site with the wireless network connection:

1. Press the *Tab* key ( ) on the keyboard to highlight the **Config** button. Press the space bar to select the button. The Configuration screens appear.
2. Press and hold down the *Alt* key on the keyboard and then press the *R* key. The Remote Sites screen appears.
3. Press the *Tab* key to highlight the **Network** button (left side of screen).
4. Press the space bar select the setting.
5. Press the *Tab* key to highlight the settings **Receive (Query)** or **Copy/Transfer** (left side of screen). Press the space bar to select the check box.

NOTE Selecting the **Receive (Query)** check box enables the user to search the Remote Site (in the Archive) for ECG files to print on the cardiograph. Selecting the **Copy/Transfer** check box enables the user to transfer ECGs from the Archive to a TraceMasterVue ECG Management System.

6. Under the **Network** tab (right of screen), press the *Tab* key to select the **Server URL** field. The cursor appears in the field.
7. Type in the URL address of the Remote Site server. The Server URL is the TraceMasterVue file server URL. The Server URL must be entered in the following format: **http://computername/EMSCOMM/**

   Computername is the TraceMasterVue file server computer name or IP address. Examples of valid URLs include:
   http://tracemaster/EMSCOMM/ or **http://10.101.2.42/EMSCOMM/**.
8. Press the *Tab* key to highlight the **User Name** field. The cursor appears in the field. Type in the user name.

NOTE The specified user name must be a member of a TraceMaster group that has View privileges to TraceMasterVue.

9. Press the *Tab* key to highlight the **Password** field. The cursor appears in the field. Type in the password assigned to the specified user.
10. Press and hold down the *Alt* key on keyboard.Press the *Z* key. The Net Connect screen appears.
11. Press the *Tab* key to highlight **Always Connected** connection.
12. Press the space bar to select the setting.
13. At the top of the screen a check mark and the word **Modified** appears. Press the *Tab* key to highlight the **Add New** button.

14 Press the space bar. The **Add New Remote Site** window appears.Type in a name for this Remote Site. Press the *Tab* key to highlight the **OK** button. Press the space bar to select the button.

The Remote Site appears in the **Remote Sites Archive** drop-down list (top of screen) and may be selected in the Archive. Press the *Enter* key (on keyboard) to save the changes and to exit the Configuration screen. The new changes are applied.

For information on using the Archive to transfer ECGs to a TraceMasterVue ECG Management System, see Chapter 4 “Orders and Archive” of the *PageWriter Trim Cardiograph Instructions for Use* available on the User Documentation CD, or download the file from the Philips InCenter web site (incenter.medical.philips.com).

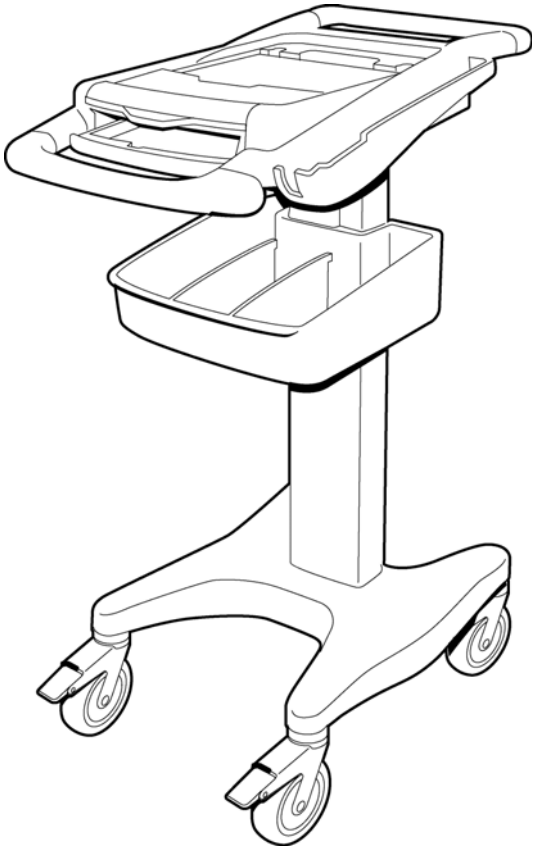
For information on troubleshooting wireless connectivity, see “Wireless Troubleshooting” on page 5-24.

D

Assembling the Cardiograph Cart and Patient Cable Arm

This Appendix includes information on how to assemble the optional cardiograph cart, and optional patient cable arm for the cardiograph cart. For information on ordering the cardiograph cart or patient cable arm, see “Upgrades and Accessories” on page 1-18.

Figure D-1 The PageWriter Trim Cardiograph Cart

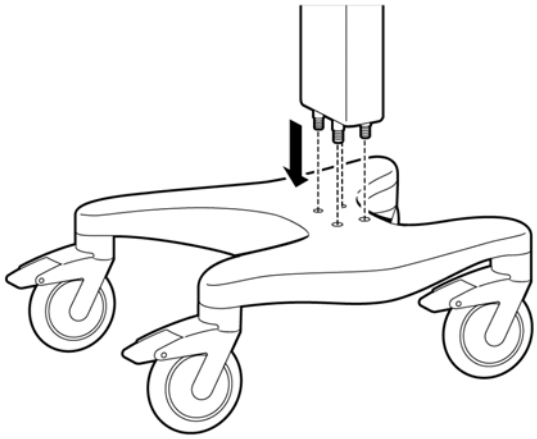


Assembling the Cart

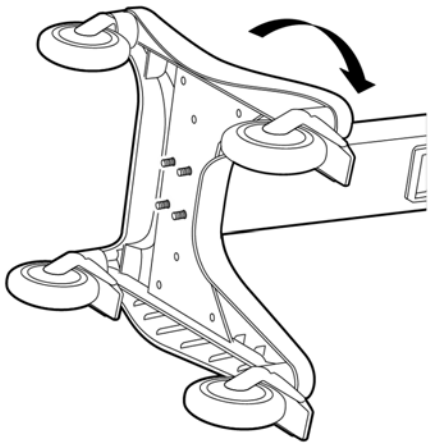
Follow this procedure to assemble the cardiograph cart.

To assemble the cart:

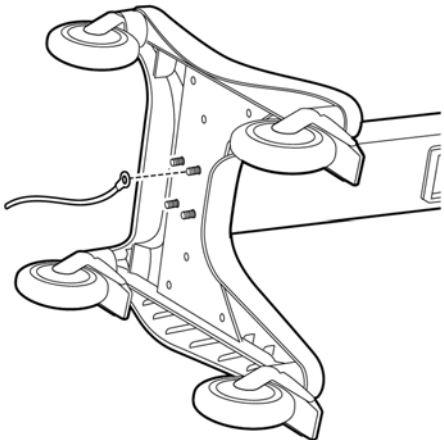
1 Insert the beam into the cart base.



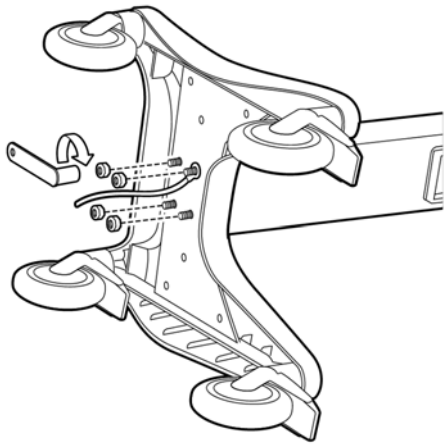
2 Hold the beam steadily. Turn the cart onto the side to expose the bottom of the cart.



3 Place the ground strap onto the screw end.

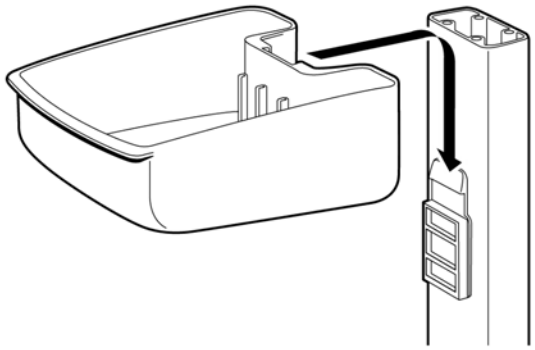


4 Attach the bolt screws and tighten using the provided wrench.

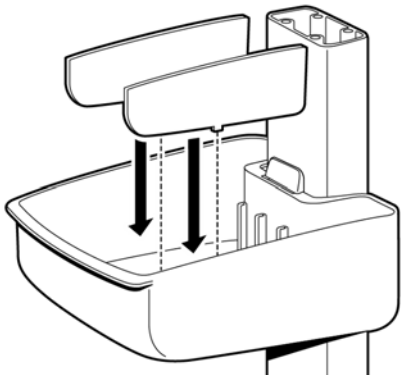


5 Turn the cart upright.

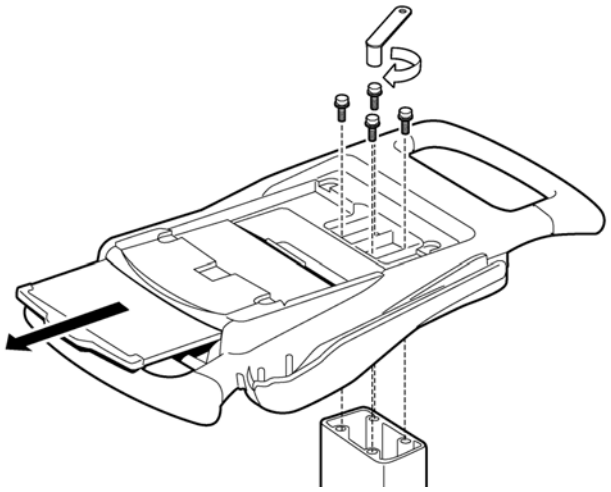
6 Attach the bin to the cart beam.



7 Insert the bin dividers.



8 Pull the tray out from the top shelf. Attach the top shelf to the beam using the provided bolts. Tighten the bolts.

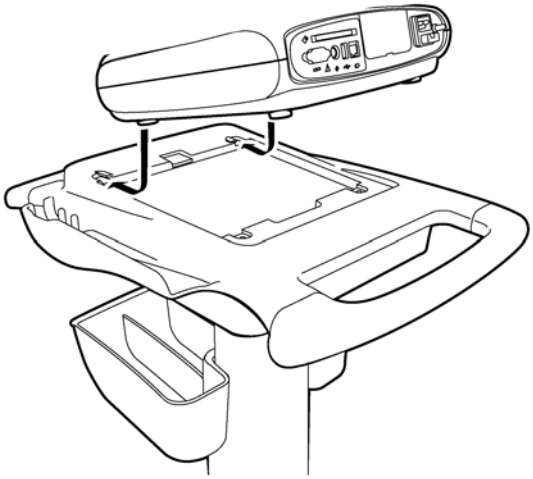


Attaching the Cardiograph to the Cart

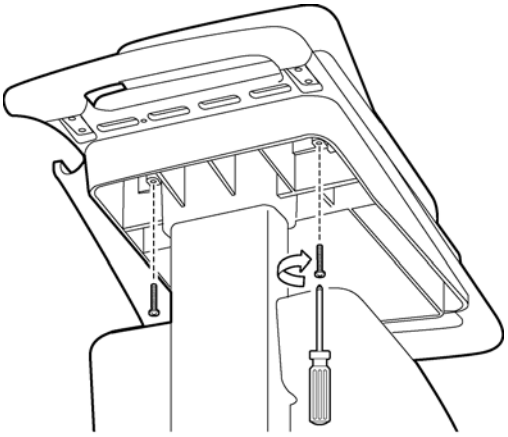
CAUTION Follow the procedure below to ensure that the cardiograph is securely fastened to the cart before use.

To attach the cardiograph to the cart:

1 Align the front feet of the cardiograph with the front locking holes on the cart. Align the rear feet of the cardiograph with the rear screw holes on the cart. Lower the cardiograph onto the cart and snap into place.



2 Insert the screws through the bottom of the cart and through the screw holes. Tighten the screws with a Phillips head screwdriver.

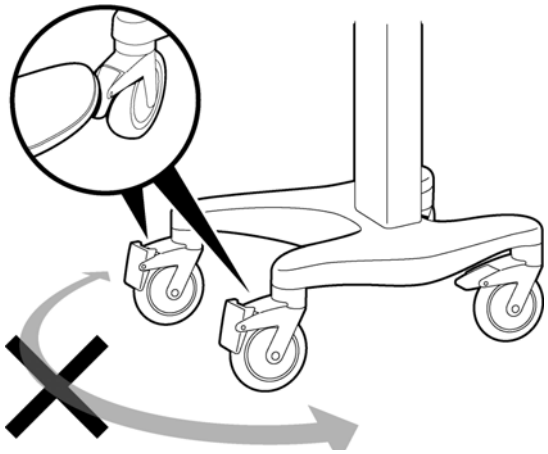


Using the Cart Wheel Positioners and Brake

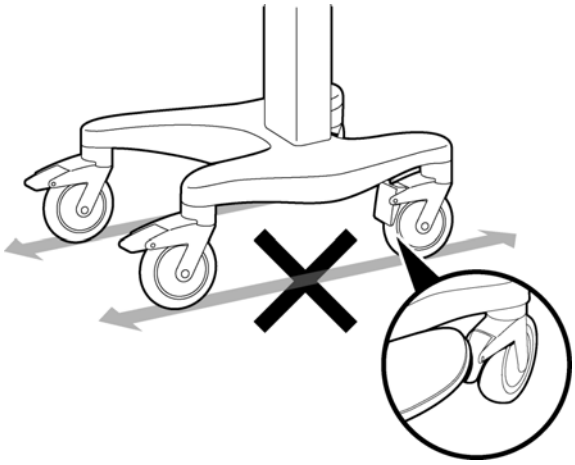
The cart includes one wheel brake and two wheel positioners. Lock the wheel positioners at all times when using the cart. The wheel positioners keep the cart straight when moving forward or backward, or when turning corners. The wheel positioners also help the cart maneuver in tight spaces.

To use the cart wheel positioners and brake:

1 Align the front wheels so that they are straight. Step on both wheel positioners. Move the cart forward until the wheels lock into position. The cart will move forward or backward in a straight line.



2 Step on the gray rear wheel brake to lock the cart wheels. The cart will not move. Step on the wheel brake again to unlock the wheels.

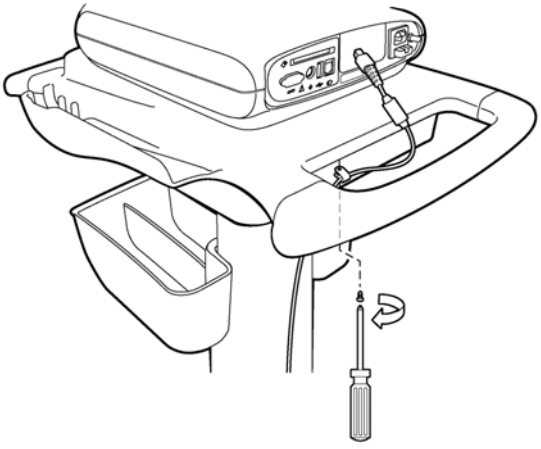


Connecting the Patient Data Cable Bracket

To connect the patient data cable bracket:

1 Insert patient data cable into the bracket.

2 Attach the patient data cable bracket to the mounting hole located on the rear of the cardiograph as shown. Tighten the screw with a Philips head screwdriver.

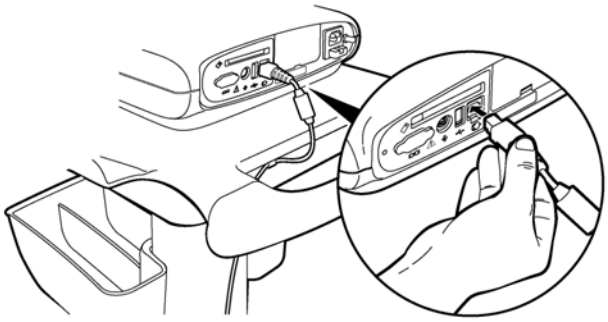


Connecting the PIM the Cardiograph

Connect the patient data cable on the PIM to the PIM connector port ( ) on the rear panel of the cardiograph.

To connect the PIM to the cardiograph:

- Connect the patient data cable to the PIM connector port on the rear of the cardiograph.

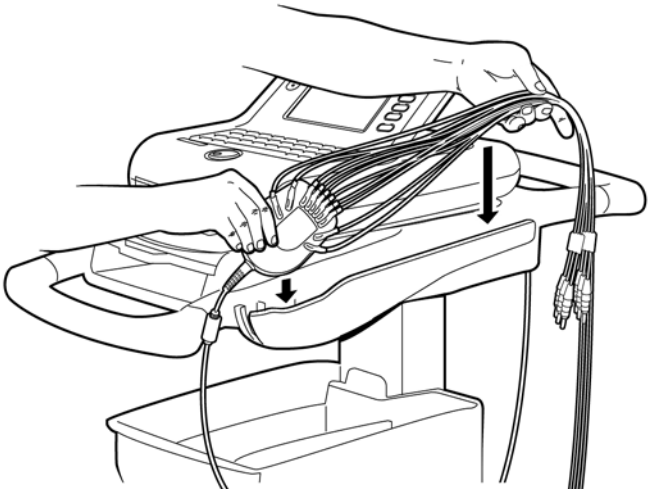


WARNING **To ensure safety and prevent damage to the system, only connect the patient data cable to the PIM connector port on the rear of the cardiograph.**

Placing the PIM in the Holder

Place the PIM in the holder when not in use. Ensure that the patient data cable rests in the recessed section of the PIM holder.

Figure D-2 Inserting the PIM into the holder

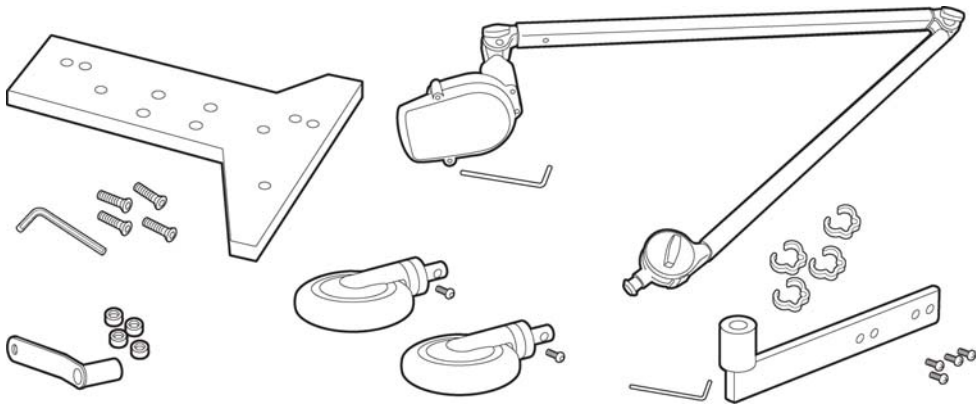


CAUTION Ensure that the PIM patient data cable and lead wires do not drag on the ground or become tangled in the cart wheels.

Assembling the Patient Cable Arm

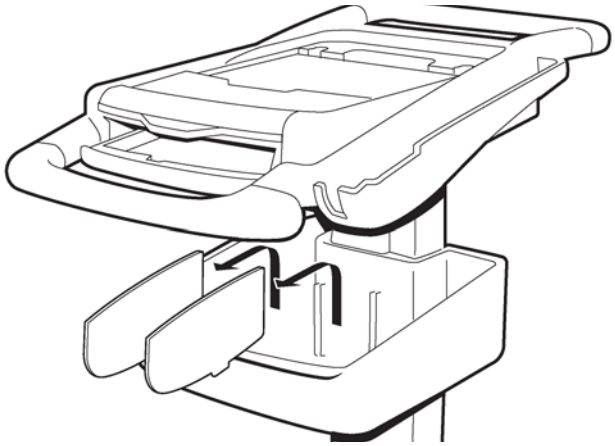
Follow this procedure to assemble the optional patient cable arm that attaches to the cardiograph cart. For information on ordering the optional patient cable arm, see “Upgrades and Accessories” on page 1-18.

Figure D-3 The Patient Cable Arm Assembly Kit

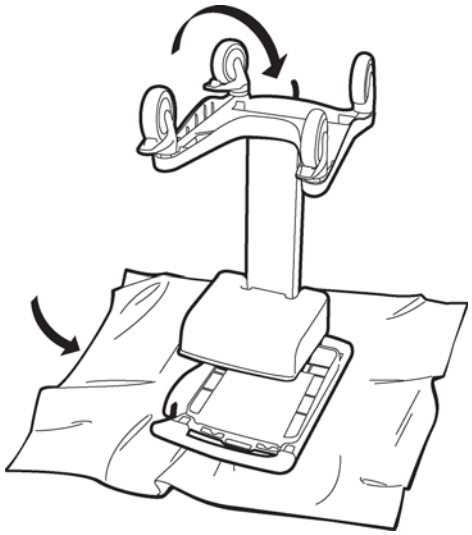


To assemble the cart:

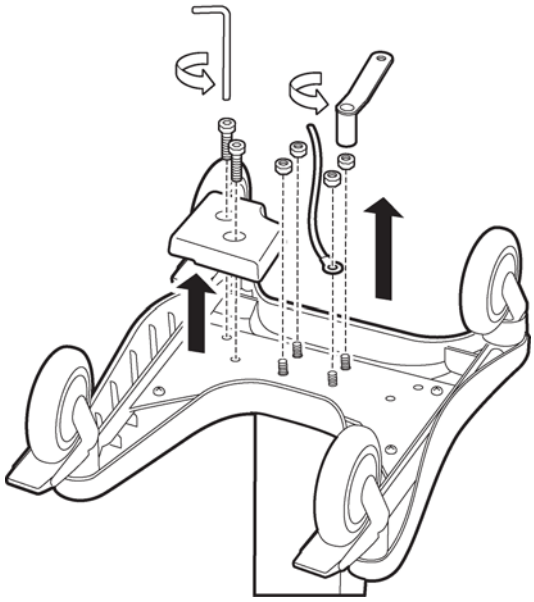
1 Remove the bin dividers from the storage bin.



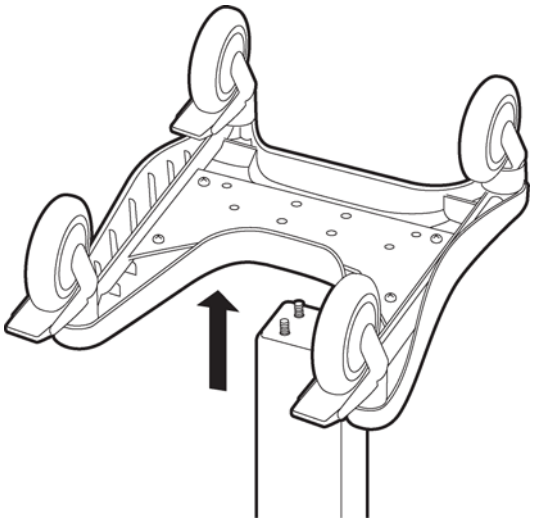
2 Place a protective cloth on the floor and turn over the cart.



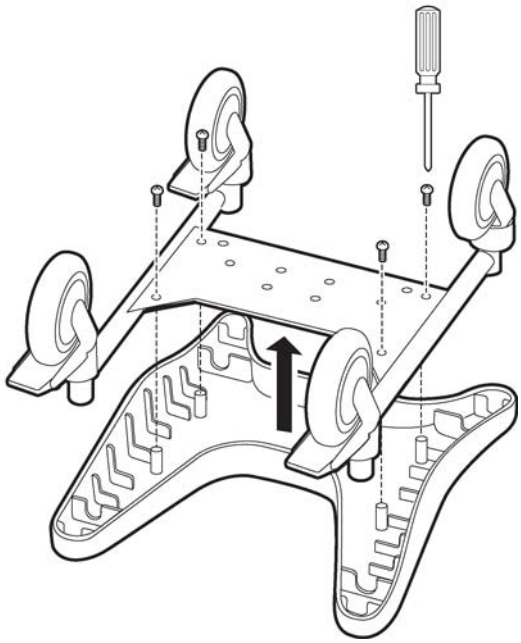
3 Remove the bolt screws, grounding strap, and counterweight as shown using the tools provided in the kit.



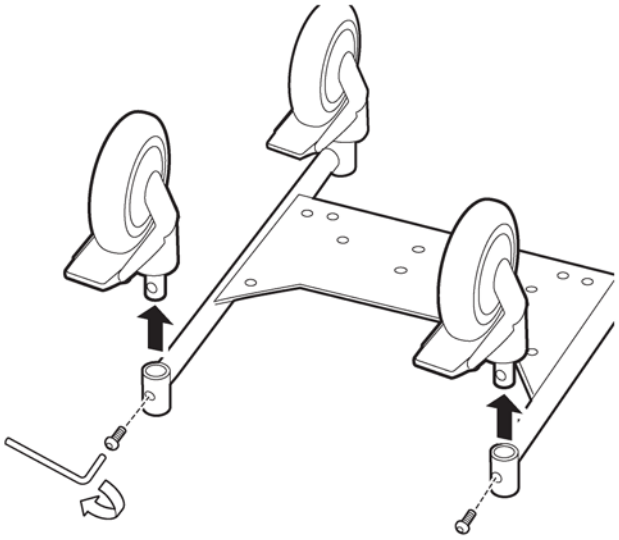
4 Remove the cart base.



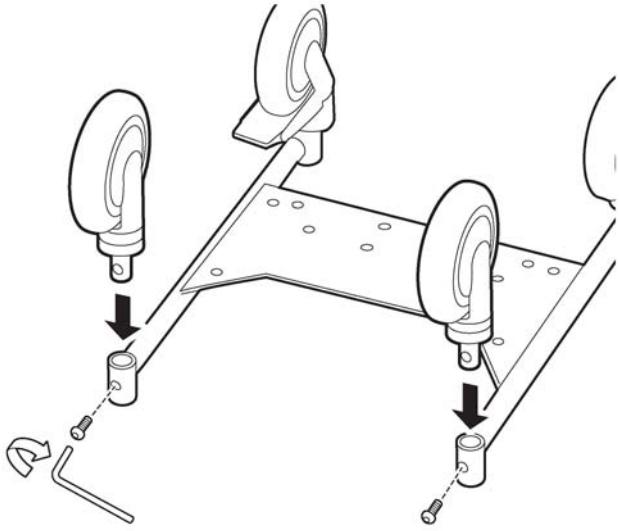
5 Remove the caster base from the bottom base as shown using a Philips head screwdriver.



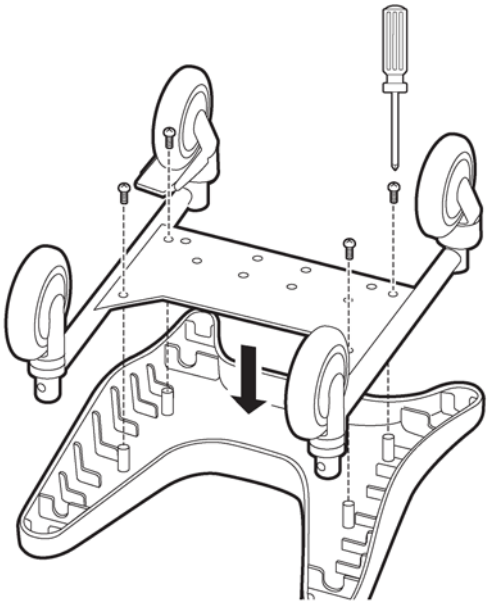
6 Remove the front casters from the base as shown.



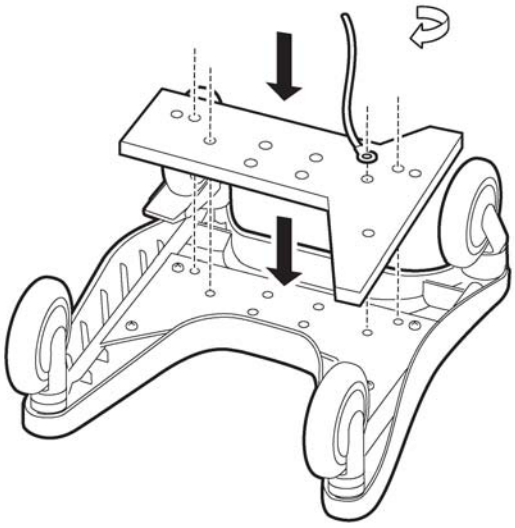
7 Insert the replacement front casters from the kit as shown. Tighten the screws as shown.



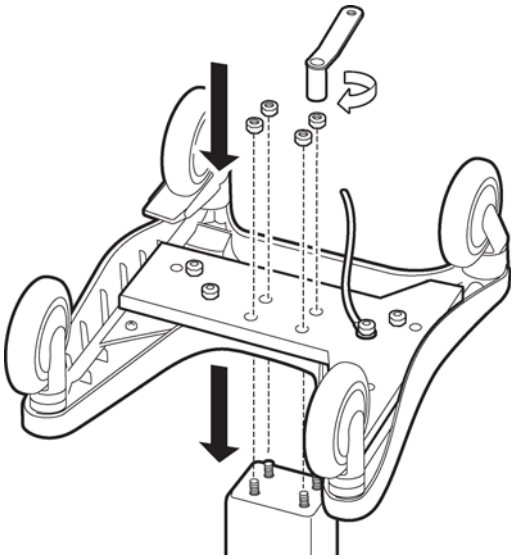
8 Attach the caster base to the cart base as shown. Tighten the screws with a Philips head screw driver.



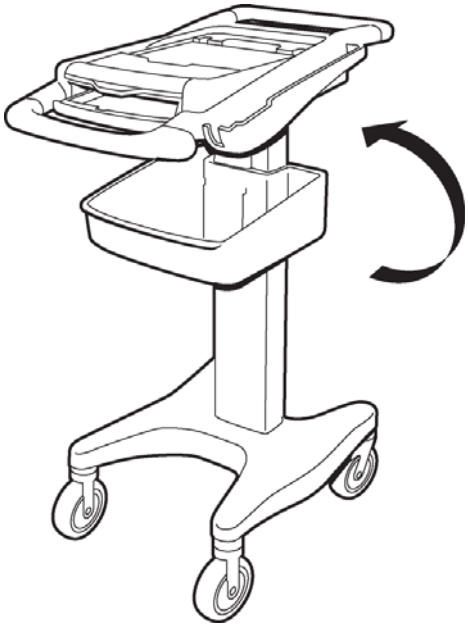
9 Attach the cart base counterweight and grounding strap as shown.



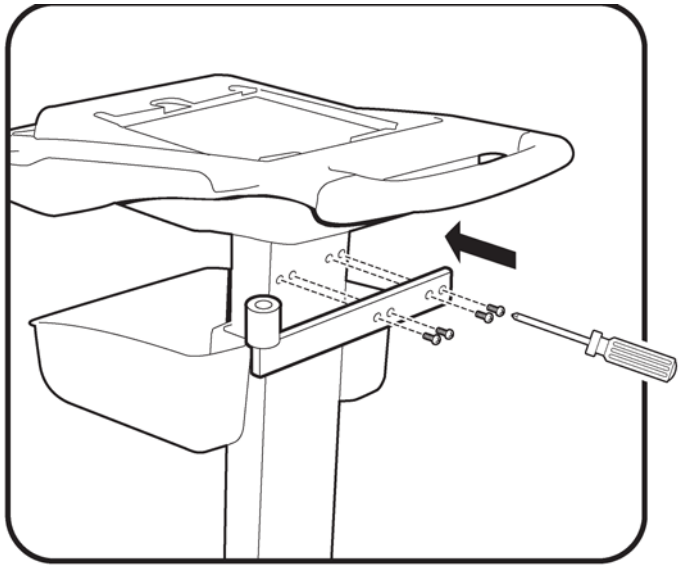
10 Reattach the bottom base to the cart beam as shown.



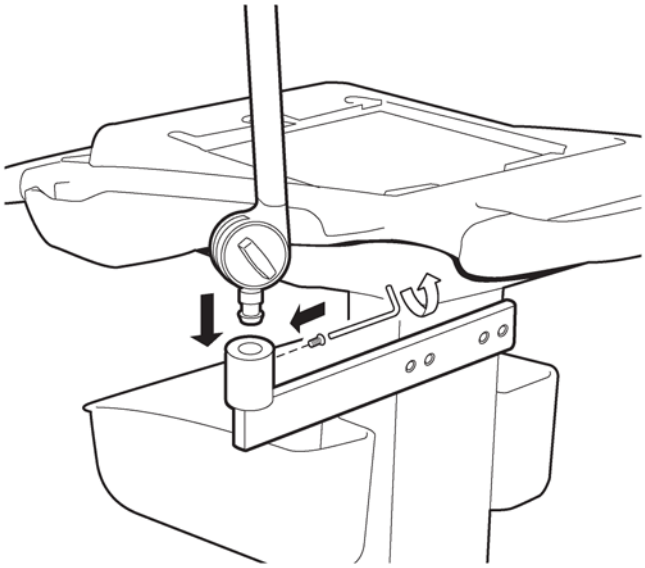
11 Flip the cart upright.



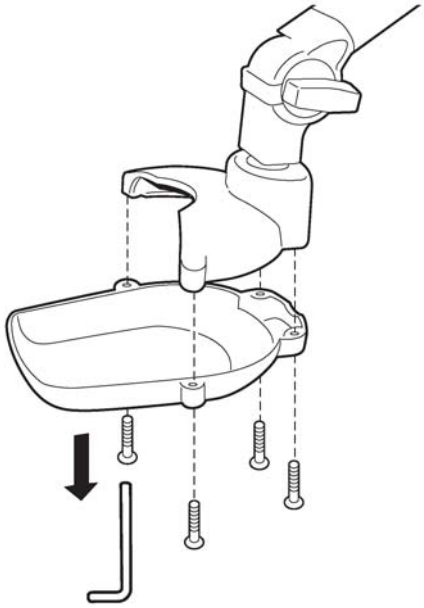
12 Connect the patient cable arm holder onto the rear of the beam as shown. Ensure that the bolt holes are properly aligned. Tighten the screws.



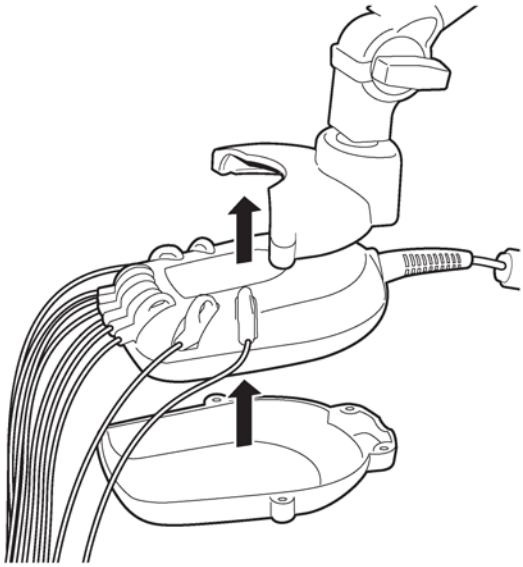
13 Insert the patient cable arm into the holder and insert the mounting screw. Tighten the screw.



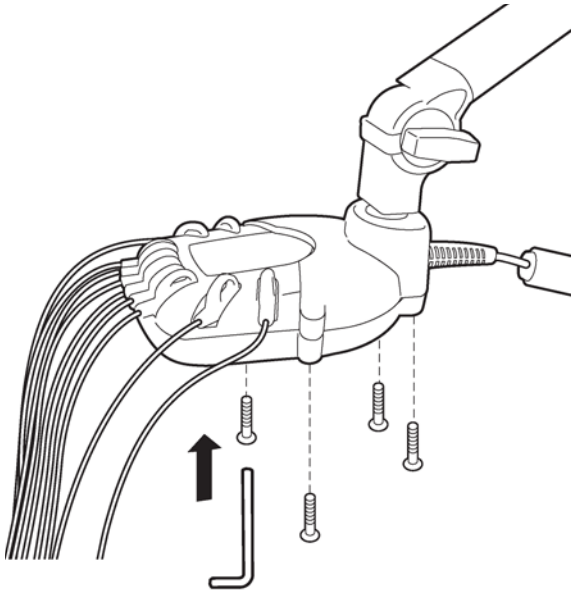
14 Remove the screws from the Patient Interface Module (PIM) holder.



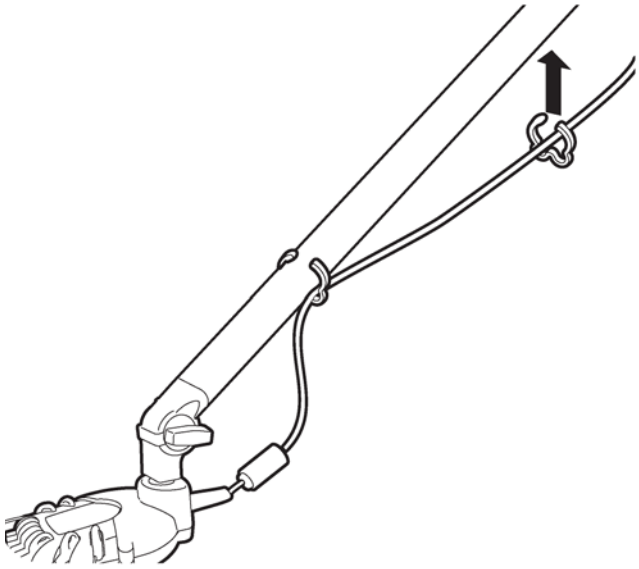
15 Insert the PIM into the holder and connect the bottom housing.



16 Secure the PIM holder housing as shown. Tighten the screws.

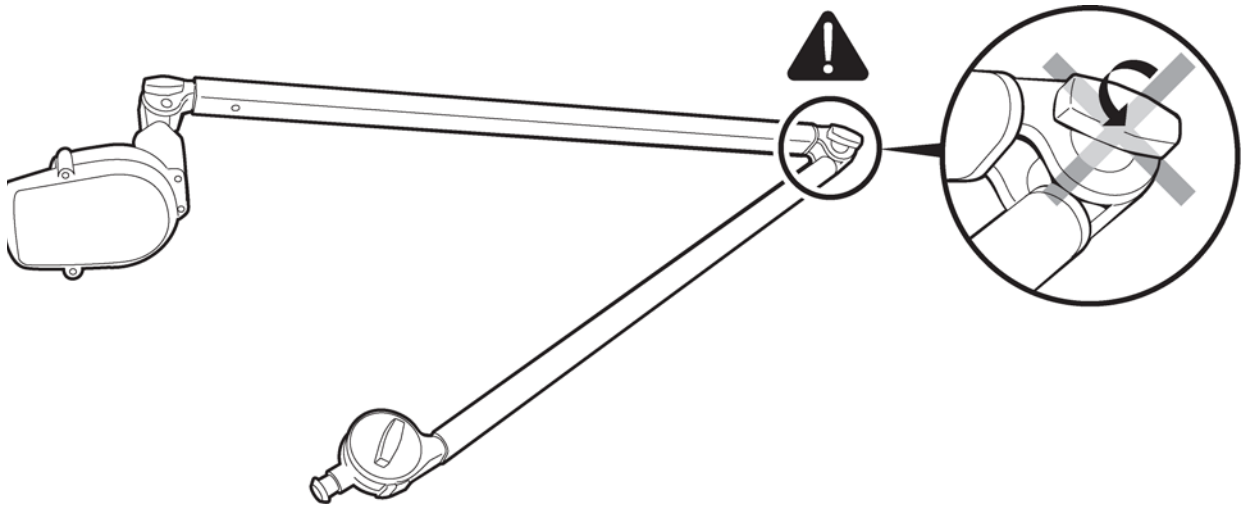


17 Attach the cable holders to the arm as shown.



18 Loosen the elbow hinge after fully assembling the patient cable arm.

CAUTION Loosen hinge carefully. Patient cable arm will open suddenly.



E

Upgrade Kits

The following upgrade kits are available for the PageWriter Trim II, III, and Rx model cardiographs:

- Interpretation
- Wireless LAN
- Ethernet LAN

For more information on ordering the upgrade kits, see “Upgrades and Accessories” on page 1-18.

NOTE There are no upgrades available for the PageWriter Trim I cardiograph.

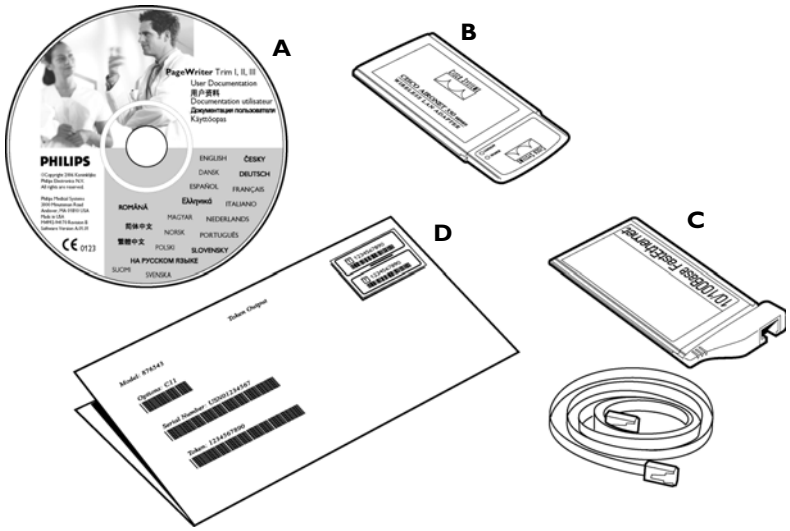
Upgrade Kit Contents

Each upgrade kit includes the following items as described in Table E-1.

Table E-1 Upgrade Kit Contents

Interpretation Upgrade Kit	Wireless LAN Upgrade Kit	Ethernet LAN Upgrade Kit
■ Token information and label ■ User Documentation CD	■ Token information and label ■ User Documentation CD ■ Wireless LAN card	■ Token information and label ■ User Documentation CD ■ Ethernet LAN card ■ Ethernet LAN cable

Figure E-1 The Upgrade Kit Contents



A User Documentation CD

B Wireless LAN Card

C Ethernet LAN Card and Cable

D Token Information and Token label

Upgrade Kit Installation

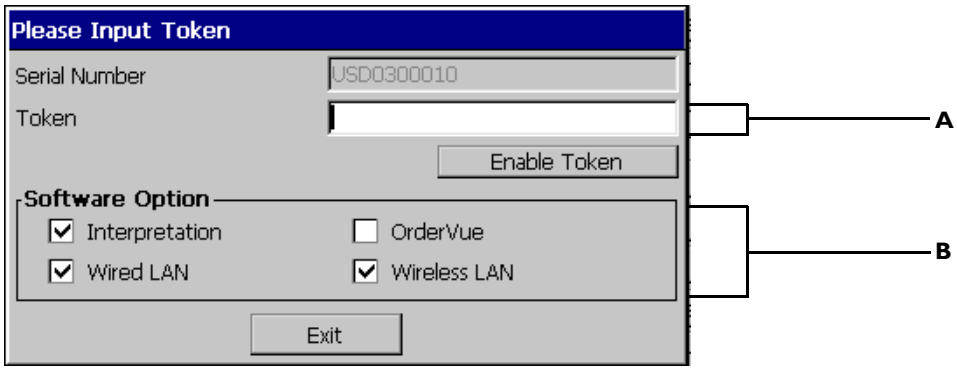
Each upgrade kit is provided with a set of instructions that describe how to enter the token number information. Entering the token number activates the software option on the cardiograph. The following instructions must be completed before configuring the specific features of the upgrade option. For more information on token numbers and where to affix the token label to the cardiograph, see “PageWriter Trim II, III and Rx Token Label” on page 1-19.

NOTE Installation of an upgrade option requires software version A.01.03 or higher. If software version A.01.03 is not installed on the cardiograph, perform the software upgrade procedure first. See “Installing PageWriter Trim II, III, and Rx Software” on page B-1.

To install the upgrade kit:

1. Return the cardiograph to active use. Press the On/Standby button if necessary.
2. Press the *Tab* key ( ) or turn the Trim Knob to highlight the **Config** button.
3. Press the space bar or the Trim Knob to select the button. The Configuration screens appear.
4. Press and hold the *Alt* key and then press the *S* key to select the **System** tab.
5. Press the *Tab* key or turn the Trim Knob to highlight the **Enable Token** button under **Software Upgrade Option** (bottom of screen).
6. Press the space bar or the Trim Knob to select the button. The Please Input Token window appears.

Figure E-2 The Please Input Token window



A Enter token number here

B Current installed options

7 Enter the token number in the **Token** field.

8 Press the *Tab* key or turn the Trim Knob to highlight the **Enable Token** button.

9 Press the space bar or the Trim Knob to select the button. The option is enabled.

10 Remove the paper drawer. Locate the existing token label inside the paper drawer compartment. Remove the existing label. Affix the new token label to the same location. For more information on token labels, see page 1-19.

11 For information on configuring the wireless LAN option, see page C-1. For information on configuring the Ethernet LAN or interpretation option, see Chapter 2 “Configuration” of the *PageWriter Trim Cardiograph Instructions for Use*, this document may be downloaded from the Philips InCenter site. See “Using the Philips InCenter Site” on page 1-26.

F

Specifications

Technical Specifications

ECG Acquisition

PageWriter Trim I

- Auto (12 leads)
- Rhythm (3 or 6 leads)

PageWriter Trim II/III/Rx

- Auto (12 leads)
- Rhythm (up to 12 leads)
- Disclose (1 lead)

Keyboard

PageWriter Trim II/III/Rx

- Full alphanumeric capability

Screen Display

PageWriter Trim I

- 40 character LCD display

PageWriter Trim II/III/Rx

- 640 x 480 pixel resolution
- Color TFT display

Patient Interface Module

- Remote, microprocessor-controlled module

Cardiograph Cart

- The cardiograph cart (optional accessory) has been tested for stability using the IEC 60601-1 test protocol.
- The IEC 60601-1 protocol calls for the cardiograph cart to not tip over using a 10 degree angle of incline in any direction. It is possible to exceed this amount of incline when the cardiograph and cart are moved over a roadside curb or some other small but steep incline. Use care when moving the cardiograph cart.
- Always remove the patient cable arm before transporting. Install the cart counterbalance prior to the installation of the Patient Cable Arm.

Signal Processing/Acquisition

Sampling Rate

- 2,000 samples per second per electrode/lead
- 24 bit A/D conversion provides 5µV resolution

Auto Frequency Response

0.05-150 Hz, 0.15-150 Hz, 0.5-100 Hz
0.05-100 Hz, 0.15-100 Hz, 0.5-100 Hz
0.05-40 Hz, 0.15-40, 0.5-40 Hz

Rhythm Frequency Response

0.05-150 Hz, 0.15-150 Hz, 0.05-150 Hz
0.15-100 Hz, 0.05-40 Hz, 0.15-40 Hz

Filters

- AC noise
- Baseline Wander
- Artifact
- High and Low Pass Frequency

Printer

Printer Resolution

- High-resolution, digital-array printer using thermal-sensitive paper
- 200 dpi at 25 mm/sec (voltage axis) by 500 dpi (time axis)

Report Formats

PageWriter Trim I

- 3x4, 1R
- 6x2 (Cabrera lead sequence only)
- 3 and 6 lead Rhythm report

PageWriter Trim II/III/Rx

- 3x4 1R, 3R (Standard, Cabrera)
- 6x2 (Standard, Cabrera)
- Panoramic 12 (Cabrera)
- 12x1(Standard, Cabrera)
- Rhythm (up to 12 selected leads)
- 12-Lead Extended Measurements
- Disclose (1 minute of continuous waveform data for 1 selected lead)

Battery Operation

Capacity

- Typically 30 ECGs on a single charge or 30 minutes of continuous rhythm recording
- No fail operation during ECG printing

Recharge

- Eight hours to full capacity

Network Connection

PageWriter Trim II/III/Rx

- 10 Base-T IEEE 802.3 Ethernet LAN

FAX Capability (optional)

PageWriter Trim II/III/Rx

- Group 3, Class 1 or 2 fax modem protocol
- Support for PCMCIA fax modem

Modem (optional for USA and Canada)

PageWriter Trim II/III/Rx

- V.90, K56flex, enhanced V.34, V.32bis, V.32, V.22 bis and below

Barcode Reader (optional)

PageWriter Trim II/III/Rx

- Reads Code 39 (standard and full ASCII) Symbology

Magnetic Card Reader (optional)

PageWriter Trim II/III/Rx

- Reads cards adhering to ISO 7810, 7811-1, -2, -3, -4, -5, and JIS X 6301 and X6302

ECG Storage

- 150 ECGs typical for the optional PCMCIA storage card

PageWriter Trim II Internal ECG Storage

- 50 ECGs

PageWriter Trim III Internal ECG Storage

- 150 ECGs

PageWriter Trim Rx Internal ECG Storage

- 200 ECGs

ECG File Formats

PageWriter Trim II/III/Rx

- XML and XML SVG

Power and Environment

- Class I, continuous operation

Line Power

- 100-240 Vac, 50/60 Hz, 65 VA max

Environmental Operating Conditions

- 10° to 40°C (50° to 104°F)
- 15% to 80% relative humidity (non-condensing)
- Up to 4,550 m (15,000 ft.) altitude

Environmental Storage Conditions

- 0° to 50 °C (32° to 122°F)
- 15% to 90% relative humidity (non-condensing)
- Up to 4,550 m (15,000 ft.) altitude

Cardiograph Dimensions

PageWriter Trim I

- 310 mm width x 388 mm depth x 106 mm height (12.2 x 15.3 x 4.2 inches)

PageWriter Trim II/III/Rx

- 310 mm width x 388 mm depth x 176 mm height (12.2 x 15.3 x 6.9 inches)

Cardiograph Weight

PageWriter Trim I

- 6.95 Kilograms (15.3 pounds)

PageWriter Trim II/III/Rx

- 7.38 Kilograms (16.3 pounds)

Cardiograph Shipping Container Dimensions

- 603.2 mm (width) x 1016 mm (depth) x 742.95 mm (height) (23.74 x 40 x 29.25 inches)

Cardiograph Shipping Container Weight

- 6.325 Kilograms (14 pounds)

Cardiograph Cart Dimensions

- 992 mm (height) x 412 mm (width) x 700 mm (length) (39.05 x 16.2 x 27.5 inches)

Cardiograph Cart Weight

- 20.32 kilograms (44.8 pounds) with single bin and counterweight installed

Fully Assembled Cardiograph Cart Shipping Container Dimensions

- 547 mm (height) x 827 mm (width) x 1107 mm (length) (21.5 x 32.5 x 43.5 inches)

Partially Assembled Cardiograph Cart Shipping Container Dimensions

- 229 mm (height) x 534 mm (width) x 1234 mm (length) (9 x 21 x 48.5 inches) Fully

Fully Assembled Cardiograph Cart Shipping Container Weight

- 11.34 kilograms (25 pounds)

Partially Assembled Cardiograph Cart Shipping Container Weight

- 4.98 kilograms (11 pounds)

Safety and Performance

Meets or exceeds the following requirements for safety and performance:

- IEC 60601-1: 1988 +A1:1991 +A2:1995 General Requirements for Safety including all National Deviations
- IEC 60601-1-2: 2001 General Requirements for Safety Electromagnetic Compatibility
- IEC 60601-2-25 1993 +A1:1999 Safety Of Electrocardiographs
- CISPR 11:1997 Radio Frequency disturbance, Limits and Methods of Test
- AAMI EC11: 1991 Diagnostic Electrocardiographic Devices
- JIST 1202: 1998 Japanese Industrial Standard for Electrocardiographs

Electromagnetic Compatibility (EMC)

Electromagnetic compatibility with surrounding devices should be assessed when using the PageWriter Trim cardiograph.

An electronic device can either generate or receive electromagnetic interference. Testing for electromagnetic compatibility (EMC) has been performed on the PageWriter Trim

cardiograph according to the international standard for EMC for medical devices (IEC 60601-1-2). This IEC standard has been adopted in Europe as the European Norm (EN 60601-1-2).

The PageWriter Trim cardiograph should not be used adjacent to, or stacked on top of other equipment. If the PageWriter Trim cardiograph must be used adjacent to or stacked on top of other equipment, verify that the cardiograph operates in an acceptable manner in the configuration in which it will be used.

The cardiograph will not malfunction when used with electrosurgical equipment.

Fixed, portable, and mobile radio frequency communications equipment can affect the performance of medical equipment. See Table F-4 on page F-12. For more information on troubleshooting, see “Troubleshooting” on page 5-1

Reducing Electromagnetic Interference

The PageWriter Trim cardiograph and accessories may become sensitive to interference from other RF energy sources including power lines. RF energy sources include other medical devices, wireless devices, information technology equipment, and radio/television transmission. Should interference be encountered, as demonstrated by artifact on the ECG trace, attempt to locate the source by assessing:

- Whether the interference is intermittent or constant?
- Does the interference occur only in certain locations?
- Does the interference occur only when in close proximity to certain medical devices?
- Does the ECG signal quality change dramatically when the AC power cord is unplugged?

Once the source of the interference is located, attempt to attenuate the EMC coupling path by distancing the cardiograph from the source of the interference as much as possible. If further assistance is needed, contact the Philips Response Center nearest you.

Table F-1 Guidance and Manufacturer’s Declaration: Electromagentic Emissions

The PageWriter Trim cardiograph is intended for use in the electromagnetic environment specified in the table below. The customer or the user of the PageWriter Trim cardiograph should assure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment: guidance
RF Emissions CISPR 11	Group 1	The PageWriter Trim cardiograph uses RF energy only for its internal function. Therefore, its RF emissions are very low are not likely to cause any interference in nearby electronic equipment.

Table F-1 Guidance and Manufacturer's Declaration: Electromagentic Emissions

The PageWriter Trim cardiograph is intended for use in the electromagnetic environment specified in the table below. The customer or the user of the PageWriter Trim cardiograph should assure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment: guidance
RF Emissions CISPR 11	Class B	The PageWriter Trim cardiograph is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic Emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Table F-2 Guidance and Manufacturer's Declaration: Electromagnetic Immunity

The PageWriter Trim cardiograph is intended for use in the electromagnetic environment specified below. The customer or the user of the PageWriter Trim cardiograph should assure that it is used in such an environment.

Emissions Test	Compliance	Compliance Level	Electromagnetic Environment: guidance
Electrostatic Discharge (ESD) IEC 61000-4-2	+/- 6 kV contact +/- 8 kV air	Complies	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical Fast transient/burst IEC 61000-4-4	+/- 2 kV for power supply line +/- 1 kV for input/output lines	Complies	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	+/- 1 kV differential mode +/- 2 kV common mode	Complies	Mains power quality should be that of a typical commercial or hospital environment.

Table F-2 Guidance and Manufacturer's Declaration: Electromagnetic Immunity *(continued)*

The PageWriter Trim cardiograph is intended for use in the electromagnetic environment specified below. The customer or the user of the PageWriter Trim cardiograph should assure that it is used in such an environment.

Emissions Test	Compliance	Compliance Level	Electromagnetic Environment: guidance
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (>30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 seconds	Complies	Mains power quality should be that of a typical commercial or hospital environment. If the PageWriter Trim cardiograph requires continuous operation during power mains interruptions, it is recommended that the PageWriter Trim be powered from an uninterruptable power supply or a battery.
Power frequency (50./60 Hz) magnetic field	3 A/m	Complies	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Note: U_T is the a.c. mains voltage prior to application of the test level.

Table F-3 Guidance and Manufacturer's Declaration: Electromagentic Immunity

The PageWriter Trim cardiograph is intended for use in the electromagnetic environment specified below. The customer or the user of the PageWriter Trim cardiograph should assure that it is used in such an environment.

Emissions Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment: guidance
Conducted RF IEC 61000-4-6	3 *Vrms* 150 kHz to 80 MHz	Complies	Portable and mobile RF communications equipment should be used no closer to any part of the PageWriter Trim, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = \left[\frac{3,5}{3Vrms}\right]\sqrt{P}$
Radiated RF IEC 61000-4-3	3 *Vrms* 80 MHz to 2.5 GHz	Complies	$d = \left[\frac{3,5}{3V/m}\right]\sqrt{P}$
			$d = \left[\frac{7}{3V/m}\right]\sqrt{P}$ Where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[a], should be less than the compliance level in each frequency range[b]. Interference may occur in the vicinity of equipment marked with the following symbol:

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from surfaces, objects, and people.

a. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radios, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the PageWriter Trim cardiograph is used exceeds the applicable RF compliance level above, the PageWriter Trim cardiograph should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the PageWriter Trim cardiograph.
b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than [3] V/m.

Table F-4 Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the PageWriter Trim Cardiograph: for equipment and systems that are not life-supporting

The PageWriter Trim cardiograph is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the PageWriter Trim cardiograph can help to prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the PageWriter Trim cardiograph as recommended below, according to the maximum output power of the communications equipment.

Rated Maximum Output Power of Transmitter W	**Separation Distance According to Frequency of Transmitter (m)**	
0.01	150 KHz to 800 KHz	800 MHz to 2.5 GHz
	$d = 1.2\ \sqrt{P}$	$d = 2.3\ \sqrt{P}$
	0.1 m	0.2 m
0.1	0.4 m	0.7 m
1	1.2 m	2.3 m
10	4.0 m	7.0 m
100	12.0 m	23.0 m

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by the absorption and reflection from structures, objects, and people.

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